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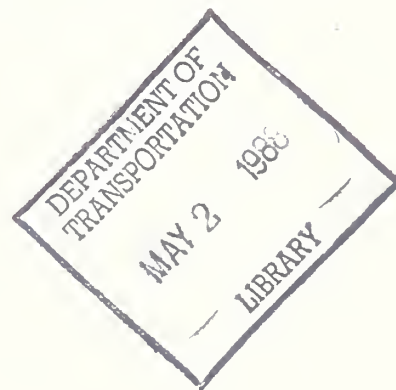
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Transportation  
National Highway  
Traffic Safety  
Administration

DOT HS 807 240

January 1988

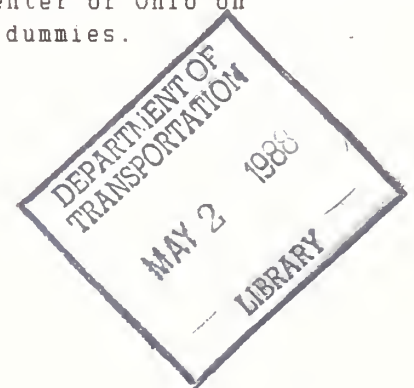
Test Report

# Vehicle Barrier Impact Testing with Hybrid III Dummies in a 1987 Ford Escort 5-Door Hatchback



The United States Government does not endorse products or manufacturers. Trade or manufacturers' names appear only because they are considered essential to the object of this report.

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15. Supplementary Notes					
16. Abstract  A 30 mph flat frontal barrier impact test was conducted on a 1987 Ford Escort 5-door hatchback at the Transportation Research Center of Ohio on December 16, 1987, using Hybrid III driver and passenger dummies.  The barrier impact velocity was 29.5 mph.  The ambient temperature was 62°F.					
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SECTION 1.0  
PURPOSE AND INTRODUCTION

## PURPOSE

This 30 mph frontal barrier impact test is part of a program to document the response of Hybrid III occupant dummies conducted for the National Highway Traffic Safety Administration (NHTSA) by the Transportation Research Center of Ohio (TRC) under Contract No. DTNH22-85-C-08123. The purpose of this test was to determine Hybrid III dummy response in the subject vehicle, a 1987 Ford Escort 5-door hatchback. The test was conducted in accordance with the FMVSS 208 portions of the Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208-06 dated May 15, 1987, except for the use of Hybrid III dummies in place of Part 572 E dummies.



## TEST SUMMARY

The 1987 Ford Escort 5-door hatchback was equipped with a 1.6 liter transverse engine, manual transmission, and power brakes. The test weight of the vehicle was 2822 pounds. The Head Injury Criteria (HIC) calculations were less than 1000, the resultant accelerations of the thorax did not exceed 60 g's, and the compressive forces transmitted through the upper legs did not exceed 2,250 pounds as measured by Hybrid III dummies seated in the driver's and right front passenger's seats.

Two Hybrid III, 50th percentile, adult male anthropomorphic test devices (ATDs) were seated in the front outboard designated seating positions. The dummies were positioned according to the dummy placement procedures specified in FMVSS 208 Notice 45.

Both ATDs were instrumented with head and chest triaxial accelerometers oriented to measure accelerations in the longitudinal, lateral, and vertical directions, a chest displacement potentiometer, right and left femur load cells, and neck load cells oriented to measure longitudinal and vertical forces and moment about the lateral axis.

The vehicle was instrumented with seven longitudinal axis accelerometers. Seat belt load cells were installed on each occupant's passive seatbelt.

The crash event was recorded by one (1) real time panning camera and fourteen (14) high speed motion picture cameras operating at approximately 500 frames per second.

The thirty-three (33) channels of data were multiplexed and recorded on a 14-track tape drive. The data was digitally sampled at 8000 samples per second digitally processed per sections 12.8 and 12.9 of the laboratory procedure.

The vehicle was impacted into the rigid, flat frontal barrier at the Transportation Research Center of Ohio on December 16, 1987. The test vehicle's impact speed was 29.5 mph. The vehicle sustained 19.1 inches of static crush.

The camera information is presented in Section 3.0. Appendix A contains the still photographic prints. Appendix B contains the vehicle and dummy data plots. Appendix C contains the pre-test and post-test dummy performance calibrations.

# CRASH TEST SUMMARY

TEST NO.: 871216

DATE: December 16, 1987

TIME: 1338

TEMP: 62°F

VEHICLE: 1987 Ford Escort 5-door Hatchback

TEST WEIGHT (LBS): 2822

IMPACT ANGLE (DEG)\*: 0

IMPACT VELOCITY (MPH)\*\*: PRIMARY = 29.5

SECONDARY = 29.4

MAX CRUSH (IN) STATIC: 19.1

REBOUND (IN): 24.8

DUMMIES: Driver

Passenger

TYPE: Hybrid III

Hybrid III

LOCATION: Front Left

Front Right

RESTRAINT: Two-point passive belt

Two-point passive belt

NUMBER OF DATA CHANNELS: 33

NUMBER OF HIGH SPEED CAMERAS: 14 and 1 real-time camera

\*With respect to tow track centerline.

\*\*Speed trap measurement ( $\pm$  .05 mph accuracy).

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Company

MAKE/MODEL: Ford Escort

VIN: 1FAPP2598HT183919

BODY STYLE: 5-door hatchback

MODEL YEAR: 1987

COLOR: Black

ENGINE DATA: TYPE: Transverse CYLINDERS: 4 DISPLACEMENT: 1.6 liter

X Gas,      DIESEL,      TURBOCHARGE

TRANSMISSION DATA: 4 SPEED, X MANUAL,      AUTOMATIC, X FWD RWD

DATA VEHICLE RECEIVED: 12/8/87

ODOMETER READING: 151

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING No

POWER BRAKES Yes

POWER SEATS No

POWER WINDOWS No

TINTED GLASS Yes

RADIO No

CLOCK Yes

OTHER None

AUTOMATIC TRANSMISSION No

AUTOMATIC SPEED CONTROL No

TILTING STEERING WHEEL No

TELESCOPING STEERING WHEEL No

AIR CONDITIONING No

ANTI-SKID BRAKE No

REAR WINDOW DEFROSTER Yes

DATA FROM CERTIFICATION LABEL ON LEFT DOOR FACE OR "B" POST:

VEHICLE MANUFACTURED BY: Ford Motor Company

DATE OF MANUFACTURE: 6/87

GVWR: 3165 LBS.

GAWR: FRONT 1811 LBS., REAR 1547 LBS.

TEST VEHICLE INFORMATION, CONTINUED

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVEBOX, ETC.

VEHICLE LOAD (UP TO CAPACITY): FRONT 30 psi; REAR 30 psi

RECOMMENDED TIRE SIZE: P165/80R13 LOAD RANGE X B,    C,    D

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Goodyear Corsa GT P165/80R13

IS SPARE TIRE "SPACE SAVER"? Yes

IS SPARE TIRE STANDARD EQUIPMENT? Yes

VEHICLE CAPACITY: TYPES OF SEATS: Front bucket  
Rear bench

TYPE OF FRONT SEAT BACKS Manual Adjustable

NUMBER OF OCCUPANTS 2 FRONT 2 REAR 4 TOTAL

CARGO LOAD 150 LBS. TOTAL 750 LBS.

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS):

RIGHT FRONT 706 lbs. RIGHT REAR 455 lbs.

LEFT FRONT 732 lbs. LEFT REAR 458 lbs.

TOTAL FRONT WEIGHT 1,438 lbs. (61.2% OF TOTAL VEHICLE WEIGHT)

TOTAL REAR WEIGHT 913 lbs. (38.8% OF TOTAL VEHICLE WEIGHT)

TOTAL DELIVERED WEIGHT 2,351 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

RCLW + RATED CARGO AND LUGGAGE WEIGHT

UDW = UNLOADED DELIVERED WEIGHT (2351 LBS)

VCW = VEHICLE CAPACITY WEIGHT (750 LBS)

DSC = DESIGNATED SEATING CAPACITY (4)

RCLW = VCW - (150) (DCS) = (150 LBS)

TARGET TEST WEIGHT = UDW + RCLW + (2 DUMMIES X 167 LBS/DUMMY)

= 2351 + 150 + 334 LBS

TARGET TEST WEIGHT = 2835 LBS

TEST VEHICLE INFORMATION, CONTINUED

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 137 LBS. CARGO:

RIGHT FRONT        749 lbs.                                RIGHT REAR        626 lbs.

LEFT FRONT        790 lbs.                                LEFT REAR        657 lbs.

TOTAL FRONT WEIGHT    1,539 lbs.    (54.5% OF TOTAL VEHICLE WEIGHT)

TOTAL REAR WEIGHT    1,283 lbs.    (45.5% OF TOTAL VEHICLE WEIGHT)

TOTAL TEST WEIGHT    2,822 lbs.    ( 0.5% UNDER TARGET WEIGHT)

WEIGHT OF BALLAST SECURED IN VEHICLE TRUNK AREA:    0 lbs.

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES): NONE

DELIVERED ATTITUDE:    LF   26.2;        RF   26.8;        LR   25.4;        RR   25.2

PRE-TEST ATTITUDE:    LF   25.7;        RF   26.4;        LR   23.2;        RR   23.3

POST-TEST ATTITUDE:    LF   27.9;        RF   30.0;        LR   22.6;        RR   22.8

WHEELBASE:    93.8 INCHES

MAX. WIDTH:    64.2 INCHES

CG =   42.6    INCHES REARWARD OF FRONT WHEEL CENTERLINE

TEST VEHICLE INFORMATION, CONTINUED

TEST CONDITIONS

TEST NUMBER: 871216

DATE OF TEST: 12/16/87

TIME OF TEST: 1338

TYPE OF TEST: Frontal Barrier Impact

IMPACT ANGLE: 0°

AMBIENT TEMPERATURE AT IMPACT AREA:

62°F

TEMPERATURE IN OCCUPANT COMPARTMENT:

70°F

DRIVER TEMPERATURE:

70°F

PASSENGER TEMPERATURE:

70°F

IMPACT VELOCITY: PRIMARY = 29.5 MPH

SECONDARY = 29.4 MPH

(SPECIFIED RANGE = 28.9 to 29.9 MPH)

VEHICLE REBOUND AND CRUSH (ALL DIMENSIONS IN INCHES)

OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 165.1 ;C 168.8 ;R 166.0

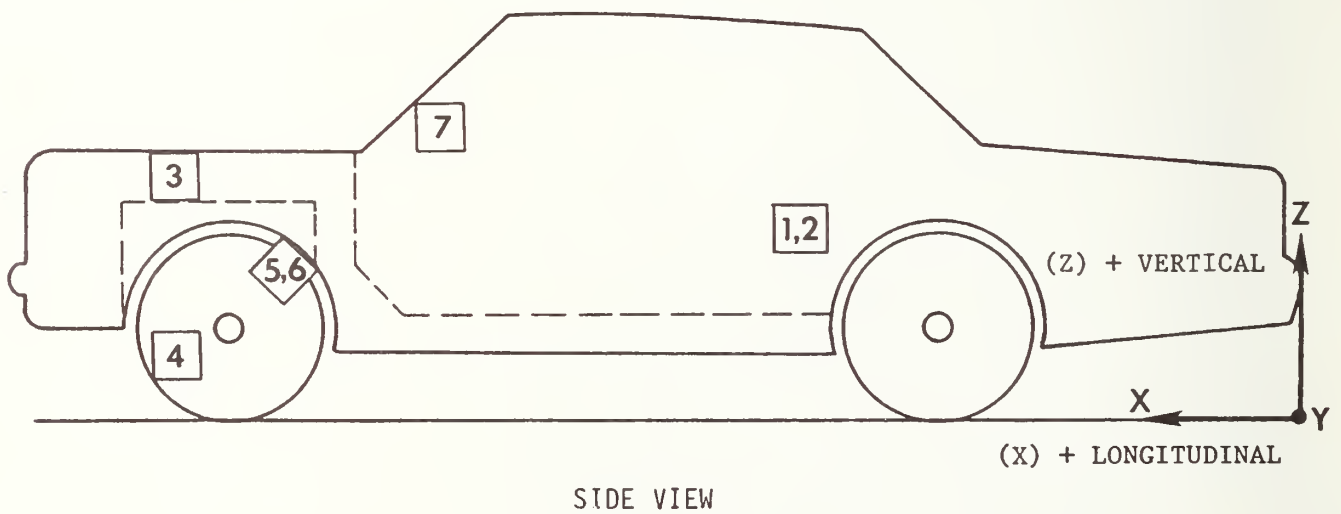
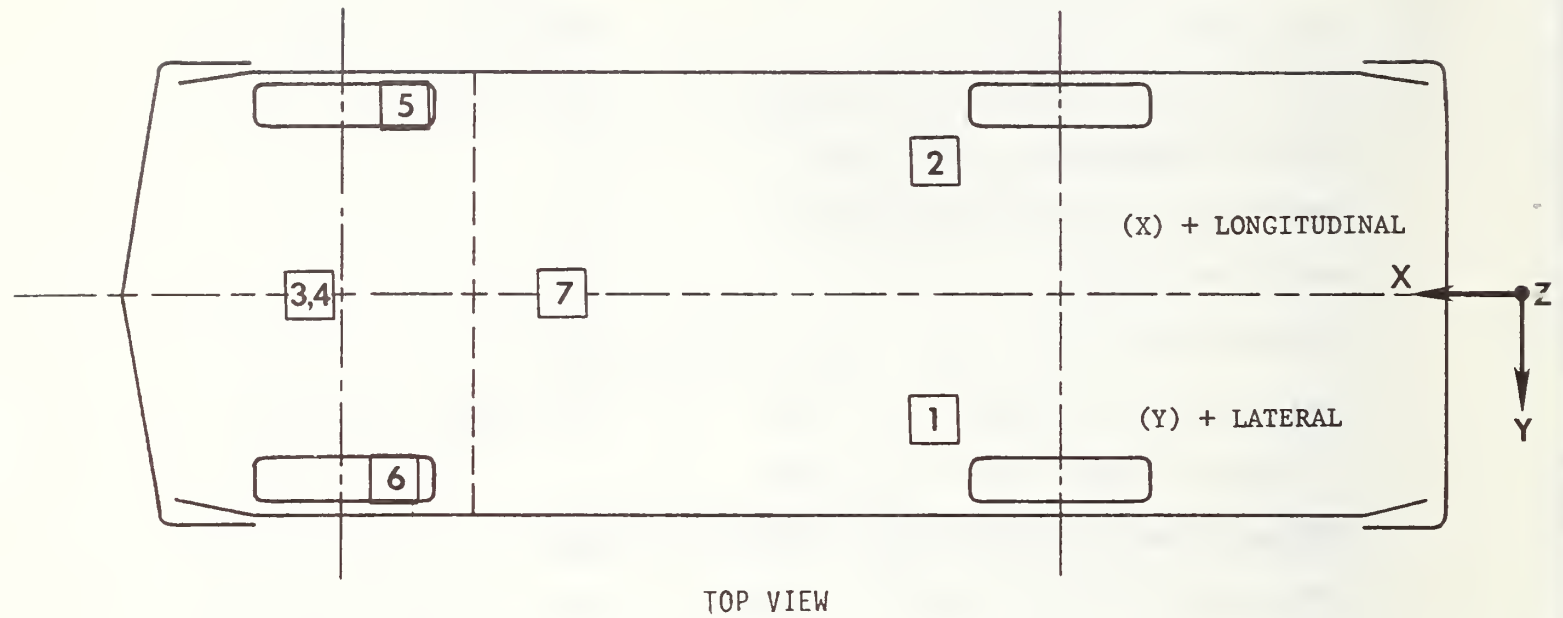
POST-TEST: L 147.4 ;C 149.7 ;R 149.6

TOTAL CRUSH: L 17.7 ;C 19.1 ;R 16.4

FOR FRONTAL IMPACT, DISTANCE FROM FRONT OF TEST VEHICLE TO BARRIER AFTER  
IMPACT: L: 25.2 ;C: 24.8 ;R: 24.4 :AVG: 24.8



# VEHICLE ACCELEROMETER LOCATIONS





TEST NUMBER 871216

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

No.	LOCATION		X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
						MAX	G MSEC	MAX	G MSEC
1	REAR SEAT CROSSMEMBER AT LEFT SIDE LONGITUDINAL	PRE	63.8	20.8	12.2				
		POST	63.8	20.8	12.5				
						1.3	114.4	27.5	50.5
2	REAR SEAT CROSSMEMBER AT RIGHT SIDE LONGITUDINAL	PRE	63.6	-21.8	12.2				
		POST	63.6	-21.8	12.6				
						1.7	135.0	26.9	54.8
3	TOP OF ENGINE BLOCK  LONGITUDINAL	PRE	139.1	0.0	31.4				
		POST	136.3	0.5	30.0				
						18.7	58.5	89.9	38.0
4	BOTTOM OF ENGINE  LONGITUDINAL	PRE	139.3	5.2	8.5				
		POST	135.9	4.4	6.9				
						24.6	53.0	82.8	33.3
5	BRAKE CALIPER AT RIGHT SIDE LONGITUDINAL	PRE	135.8	-25.8	8.0				
		POST	132.2	-26.5	7.6				
						25.6	50.3	71.2	29.0
6	BRAKE CALIPER AT LEFT SIDE LONGITUDINAL	PRE	135.9	25.8	8.5				
		POST	132.4	28.2	7.4				
						32.2	53.3	73.5	34.4
7	DASH PANEL  LONGITUDINAL	PRE	105.5	-1.0	36.4				
		POST	105.2	-1.0	37.4				
						10.1	113.8	65.9	80.4

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: FORWARD FROM REAR BUMPER  
Y: LEFT FROM VEHICLE CENTERLINE  
Z: UPWARD FROM GROUND LEVEL

# ACCIDENT INVESTIGATION DIVISION DATA

## FOR 30 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Ford Escort 5-door Hatchback

VEH. NHTSA NO.: \_\_\_\_\_; VIN: 1FAPP2598HT183919

MODEL YEAR: 1987; BUILD DATE: 6/87; TEST DATE 12/16/87

VEH. SIZE CATEGORY: Compact; TEST WEIGHT: 2822

VEH. WHEELBASE: 93.8 FRONT OVERHAND: 35.9 MAX. WIDTH: 64.2

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE: 12FDEW2

### F (Frontal)

CRUSH DEPTH  
DIMENSIONS:

C1 = 17.7 inches

C2 = 17.9 inches

C3 = 18.3 inches

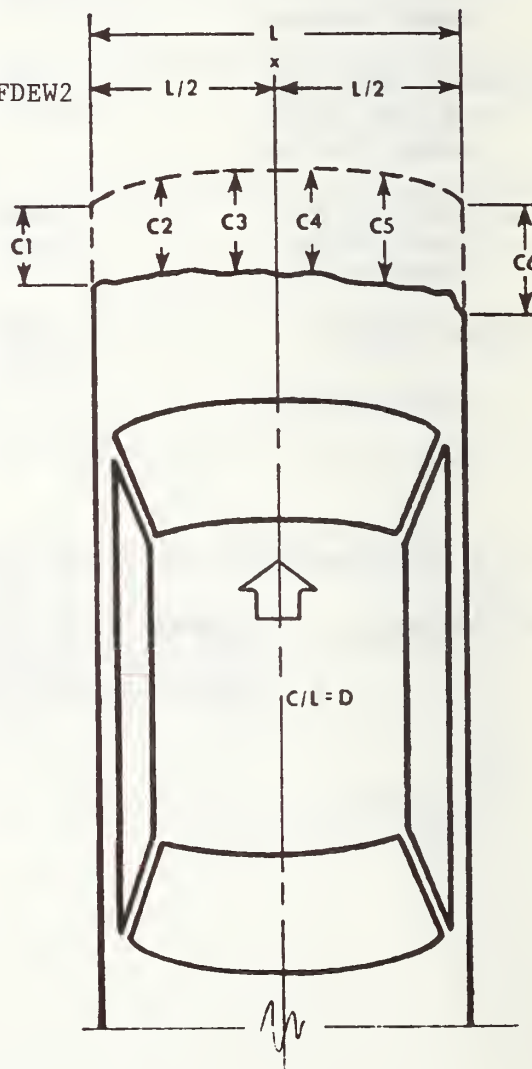
C4 = 18.5 inches

C5 = 17.9 inches

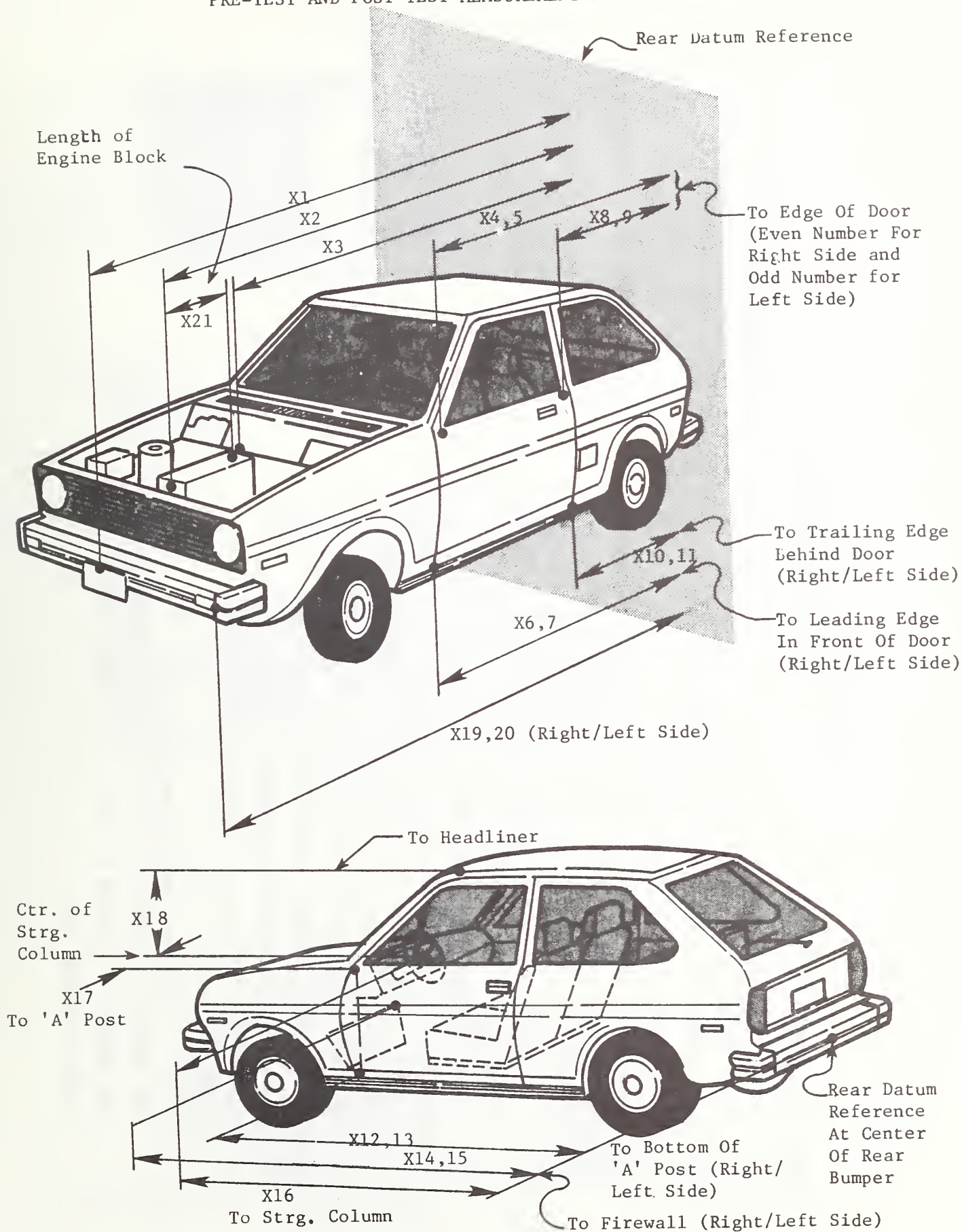
C6 = 16.4 inches

MIDPOINT OF DAMAGE: D = Vehicle Centerline  
(Longitudinal)

LENGTH OF DAMAGED  
REGION: L = 56.2 inches



# PRE-TEST AND POST-TEST MEASUREMENT POINTS





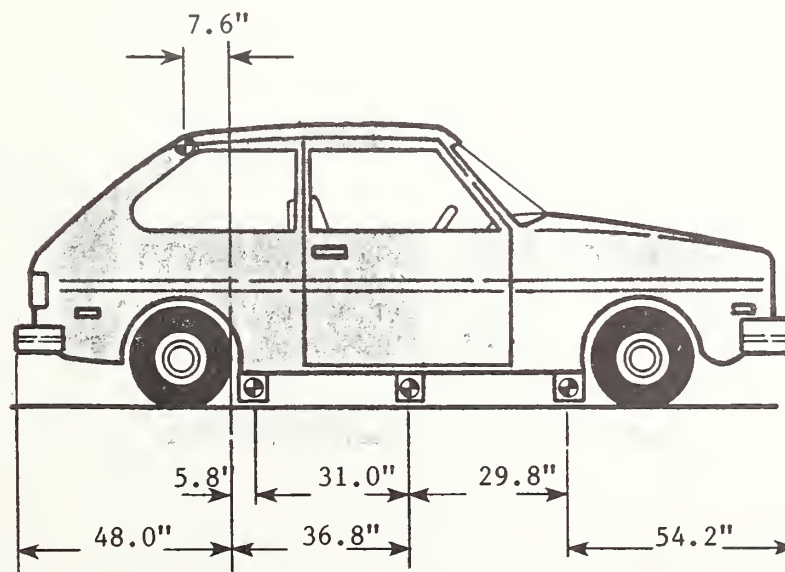
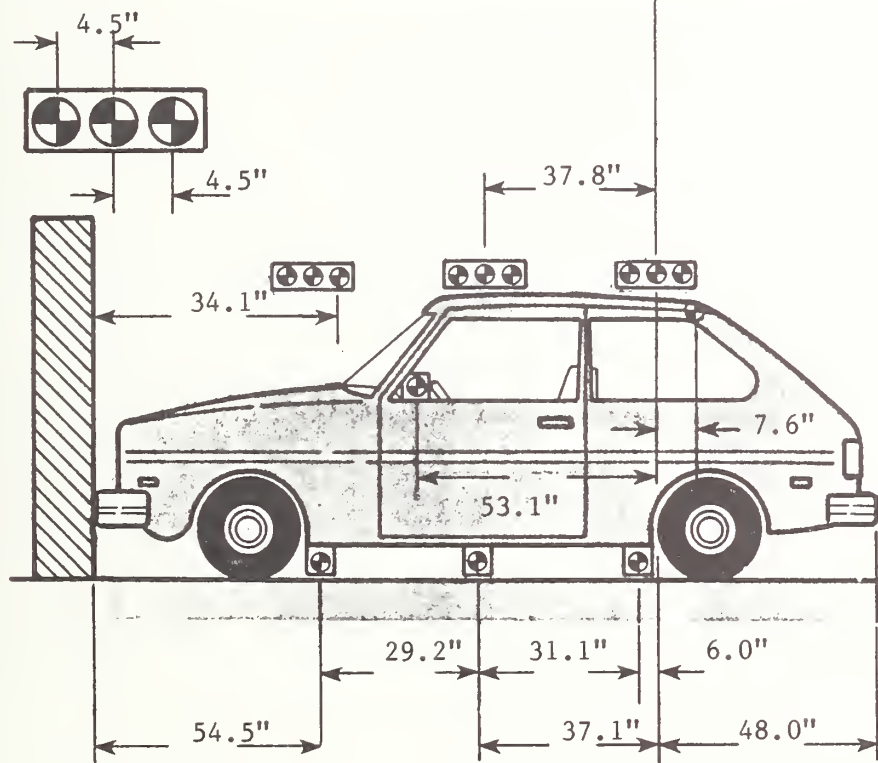
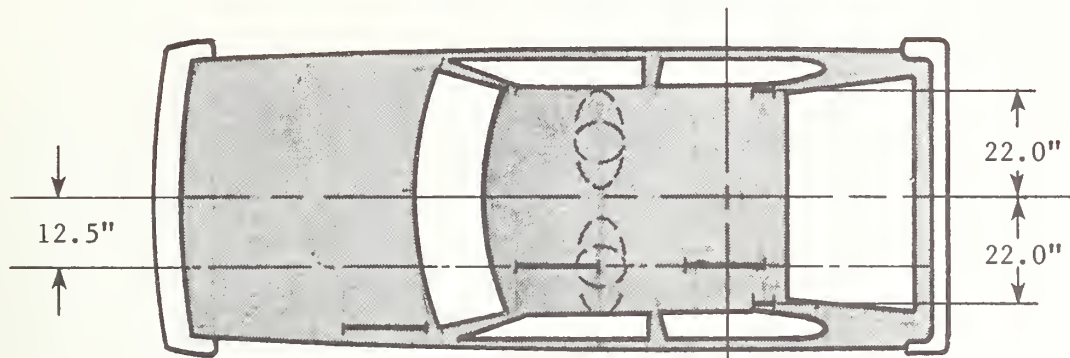
# IMPACTED VEHICLE MEASUREMENTS

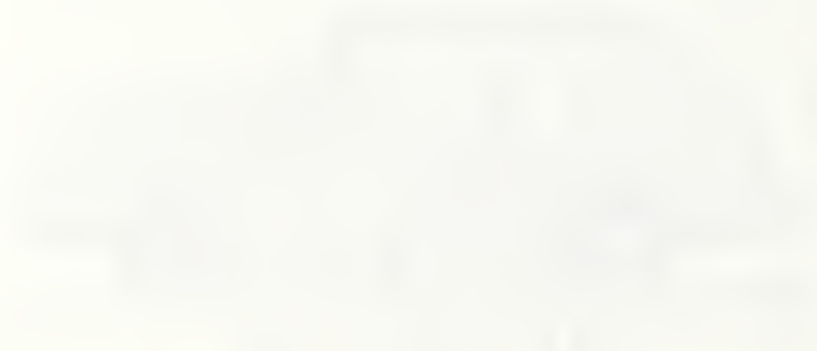
VEHICLE MAKE/MODEL Ford/Escort

TEST NUMBER 871216

NO.	TYPE OF MEASUREMENT	DIMENSIONS IN INCHES		
		PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	168.8	149.7	19.1
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	143.4	139.9	3.5
X3	REAR SURFACE OF VEHICLE TO FIREWALL	125.7	123.7	2.0
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	110.1	110.1	0.0
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	110.1	109.9	0.2
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	110.3	110.5	-0.2
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	110.3	110.0	0.3
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	73.5	73.3	0.2
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	73.5	73.2	0.3
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	73.0	73.0	0.0
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	72.8	73.0	-0.2
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	109.1	108.9	0.2
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	108.9	108.9	0.0
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	125.4	122.1	3.3
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	124.2	124.8	-0.6
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	94.6	95.2	-0.6
X17	CENTER OF STEERING COLUMN TO "A" POST	13.2	13.1	0.1
X18	CENTER OF STEERING COLUMN TO HEADLINING	16.5	17.2	-0.7
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	166.0	149.6	16.4
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	165.1	147.4	17.7
X21	LENGTH OF ENGINE BLOCK	17.2	17.2	0.0

# VEHICLE TARGET LOCATIONS





SECTION 2.0

SUMMARY OF TEST RESULTS

## DATA SUMMARY

The driver's Head Injury Criteria, HIC, was 830. The driver's maximum chest deceleration over three milliseconds was 41.7 g. The driver's right and left compressive femur loads were 807.8 pounds and 872.1 pounds, respectively. The driver's maximum chest displacement was 1.7 inches.

The right front passenger's Head Injury Criteria, HIC, was 611. The right front passenger's maximum chest deceleration over three milliseconds was 35.3 g. The right front passenger's right and left compressive femur loads were 976.5 pounds and 654.5 pounds, respectively. The right front passenger's maximum chest displacement was 2.2 inches.

The vehicle's restraint system met the comfort and convenience requirements of FMVSS 208.



# DUMMY DATA SUMMARY

DRIVER DUMMY					PASSENGER DUMMY			
SN: 45					SN: 143			
	POSITIVE		NEGATIVE		POSITIVE		NEGATIVE	
	DIRECTION*		DIRECTION**		DIRECTION*		DIRECTION**	
	MAX	TIME	MAX	TIME	MAX	TIME	MAX	TIME
HEAD ACCELERATION (g)								
LONGITUDINAL	28.8	185.6	83.4	82.4	86.0	173.8	44.3	97.4
LATERAL	5.4	80.8	12.0	91.6	6.6	173.2	6.0	226.9
VERTICAL	2.8	307.8	64.6	74.9	3.3	8.0	50.7	79.4
RESULTANT	103.1	75.0			89.3	173.8		
HIC	830 from 65.0 to 91.9 msec				611 from 66.4 to 102.4 msec			
NECK LOADS (lbs)								
SHEAR (X)	320.9	78.9	35.8	199.8	333.0	98.0	33.5	180.2
AXIAL (Z)	442.0	82.0	21.7	108.9	478.0	83.2	7.5	17.5
NECK MOMENTS (lb-ft)								
ABOUT LATERAL	22.2	100.1	20.9	56.2	61.3	93.2	19.1	224.8
CHEST ACCELERATION (g)								
LONGITUDINAL	4.3	130.9	42.3	67.2	4.3	240.6	38.7	74.2
LATERAL	3.6	53.1	6.2	79.4	3.6	53.8	7.1	89.5
VERTICAL	5.1	68.2	4.6	86.9	13.2	91.1	4.4	187.4
RESULTANT	42.8	67.2			39.6	74.2		
3 MSEC CLIP	41.7				35.3			
CHEST DISPLACEMENT (in)								
	1.7	86.1	0.0	25.5	2.2	86.5	0.0	0.0
FEMUR LOADS (lbs)								
LEFT	73.9	117.6	872.1	57.1	47.5	334.5	654.5	83.8
RIGHT	89.6	129.0	807.8	40.2	23.8	326.1	976.5	71.8
*LONGITUDINAL:	FORWARD		**LONGITUDINAL:		REARWARD			
LATERAL:	LEFTWARD		LATERAL:		RIGHTWARD			
VERTICAL:	UPWARD		VERTICAL:		DOWNWARD			
DISPLACEMENT:	INWARD		DISPLACEMENT:		OUTWARD			
FORCE:	TENSION		FORCE:		COMPRESSION			

SEAT BELT DATA SUMMARY

<u>LOCATION</u>	<u>MAX. LBS.</u>	<u>TIME, MSEC.</u>
DRIVER'S PASSIVE BELT	1945.1	77.9
RIGHT FRONT PASSENGER'S PASSIVE BELT	1946.2	82.6

## DUMMY KINEMATIC SUMMARY

### DRIVER DUMMY

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head rotated forward impacting the steering wheel as the dummy's chest was restrained by the two-point passive seat belt. The dummy's head rotated rearward into the head restraint as the dummy rebounded into the seatback. The dummy came to rest seated upright in the driver's seat restrained by the two-point passive seat belt.

### PASSENGER DUMMY

Upon impact, the passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head rotated forward as the dummy's chest was restrained by the two-point passive seat belt. The dummy's head rotated rearward into the head restraint as the dummy rebounded into the seatback. The dummy came to rest seated upright in the passenger's seat restrained by the two-point passive seat belt.

VISIBLE DUMMY CONTACT POINTS:

	DRIVER	PASSENGER
Head	<u>Steering wheel rim and hub</u>	<u>None</u>
Chest	<u>None</u>	<u>None</u>
Abdomen	<u>None</u>	<u>None</u>
Left Knee	<u>Instrument panel</u>	<u>Instrument panel</u>
Right Knee	<u>Instrument panel</u>	<u>Instrument panel</u>

DOOR OPENING:

	LEFT	RIGHT
Front	<u>Easy</u>	<u>Difficult, no tools required</u>
Rear	<u>Easy</u>	<u>Easy</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	<u>None</u>	<u>None</u>
Rear	<u>NA</u>	<u>NA</u>

GLAZING DAMAGE: Three cracks on left side of windshield.

\_\_\_\_\_

\_\_\_\_\_

OTHER NOTABLE IMPACT EFFECTS:

None

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

DUMMY POSITIONING DATA FOR  
30 MPH FRONTAL BARRIER IMPACT TEST

**PRE-IMPACT DATA:**

Make/Model: Ford Escort  
Body Style: 5-door Hatchback Model Year: 1987  
NETSA No.: \_\_\_\_\_ Color: Black

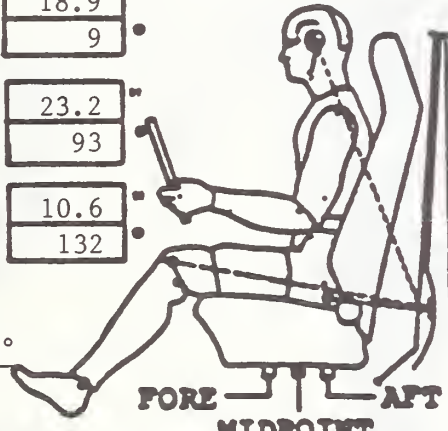
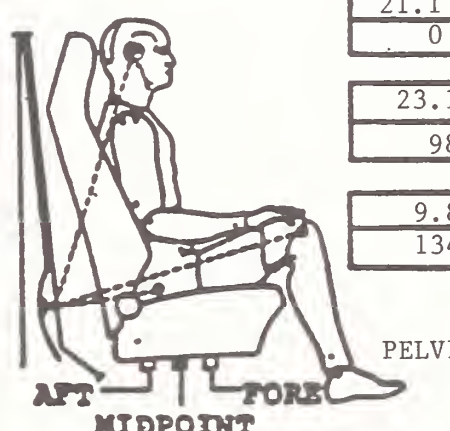
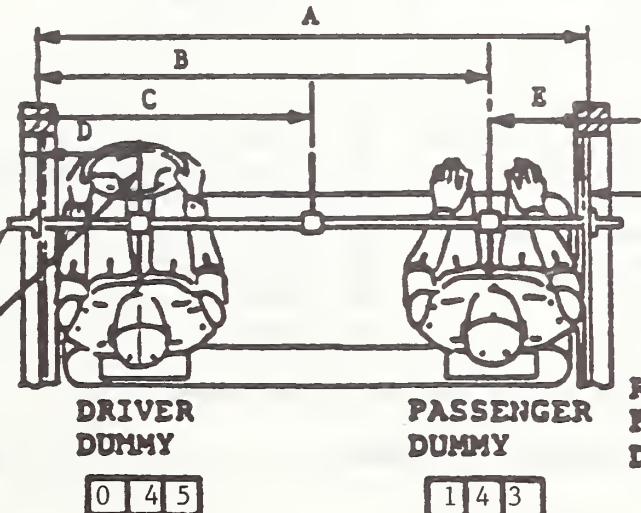
**DATA FROM CERTIFICATION LABEL:**

Vehicle Manufacturer: Ford Motor Company  
Date of Manufacture: 6/87 ; VIN: 1FAPP2598HT183919  
GVWR: 3165 lb; GAWR: Front = 1811 lb; Rear = 1547 lb

**POST-IMPACT DATA:**

Date of Test: 12/16/87 Time: 1040 Temperature 71 °F  
Required Impact Velocity Range: 28.9 to 29.9 mph  
Impact Velocity: Primary = 29.5 mph Secondary = 29.4 mph  
Seat Type: Bucket Adjuster Type: Manual  
Bucket Seat Back Type: Adjustable

Technicians: B. Miller, B. Fishbaugh

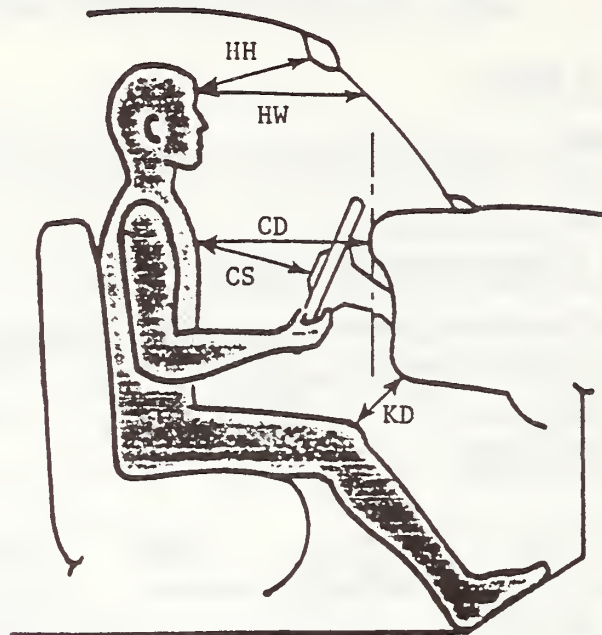
DRIVER DUMMY# <span style="border: 1px solid black; padding: 2px 5px;">0</span> <span style="border: 1px solid black; padding: 2px 5px;">4</span> <span style="border: 1px solid black; padding: 2px 5px;">5</span>	PASSENGER DUMMY # <span style="border: 1px solid black; padding: 2px 5px;">1</span> <span style="border: 1px solid black; padding: 2px 5px;">4</span> <span style="border: 1px solid black; padding: 2px 5px;">3</span>
<div style="display: flex; justify-content: space-between;"><div style="width: 30%;"><p>HEAD TARGET <span style="border: 1px solid black; padding: 2px 10px;">18.9</span> "</p><p>KNEE JOINT <span style="border: 1px solid black; padding: 2px 10px;">23.2</span> "</p><p>APPROX-IMATE "H" POINT <span style="border: 1px solid black; padding: 2px 10px;">10.6</span> "</p><p>PELVIS 25°</p></div><div style="width: 60%; text-align: center;"></div></div>	<div style="display: flex; justify-content: space-between;"><div style="width: 30%;"><p>HEAD TARGET <span style="border: 1px solid black; padding: 2px 10px;">21.1</span> "</p><p>KNEE JOINT <span style="border: 1px solid black; padding: 2px 10px;">23.1</span> "</p><p>APPROX-IMATE "H" POINT <span style="border: 1px solid black; padding: 2px 10px;">9.8</span> "</p><p>PELVIS 25°</p></div><div style="width: 60%; text-align: center;"></div></div>
	
LEFT FRONT DOOR	RIGHT FRONT DOOR
<span style="border: 1px solid black; padding: 2px 5px;">0</span> <span style="border: 1px solid black; padding: 2px 5px;">4</span> <span style="border: 1px solid black; padding: 2px 5px;">5</span>	<span style="border: 1px solid black; padding: 2px 5px;">1</span> <span style="border: 1px solid black; padding: 2px 5px;">4</span> <span style="border: 1px solid black; padding: 2px 5px;">3</span>



# DUMMY IN-VEHICLE POSITION RECORDING SHEET

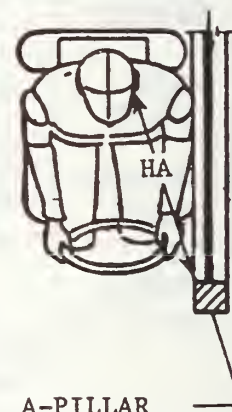
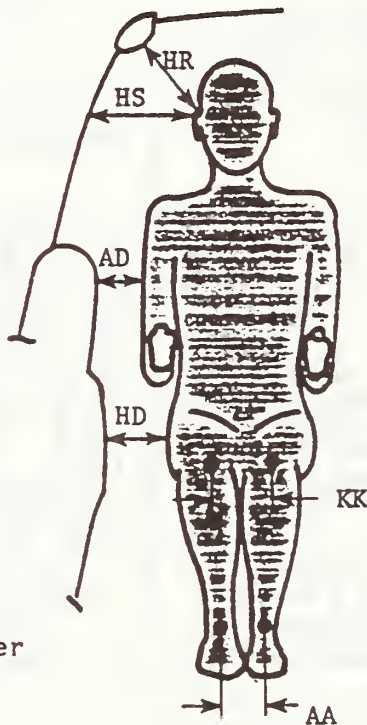
DRIVER PASSENGER  
045 143

HH	12.2	13.8
HW	17.8	18.9
CD	18.6	20.1
CS	11.5	---
KDL	2.1	3.2
KDR	2.1	3.1
TA	17°	18°
SA	30°	30°
HA	9.8	11.1



DRIVER PASSENGER  
045 143

HR	6.9	5.4
HS	9.5	9.4
AD	3.1	3.6
HD	5.4	4.3
KK	8.0	7.9
AA	9.2	6.4



A-PILLAR

Knee outer bolt head to outer bolt head spacing:

Driver = 10.6

Passenger = 10.6

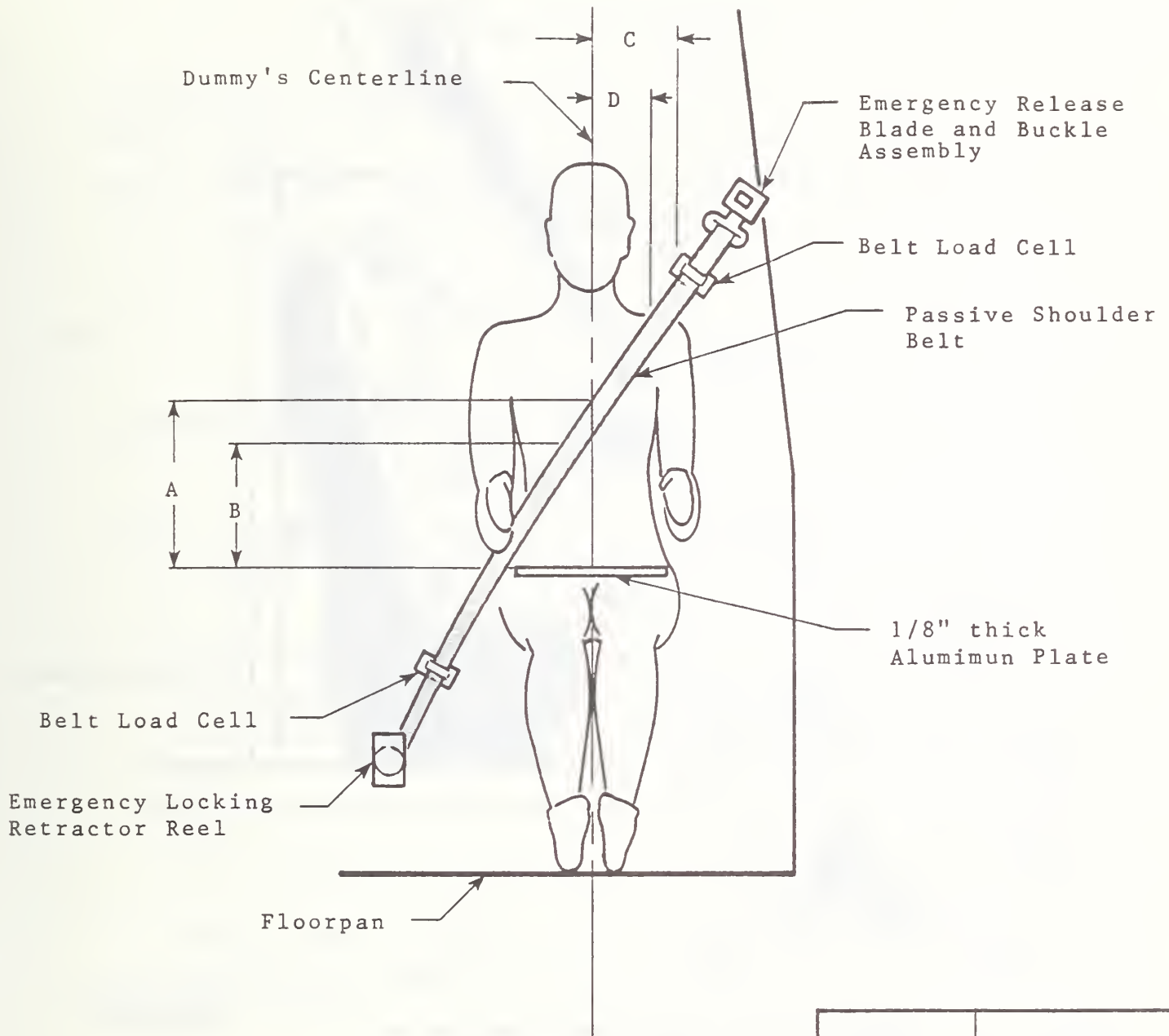
HH = Head to Windshield Header  
HW = Head to Windshield  
CD = Chest to Dash  
CS = Chest to Steering Wheel  
KD = Knee to Dash  
TA = Torso Angle  
SA = Seat Back Angle

HR = Head to Side Roof  
HS = Head to Side Window  
AD = Arm to Door  
HD = Hip to Door  
KK = Knee to Knee  
AA = Ankle to Ankle  
HA = Head to A Pillar

Torso and seat back angles are relative to vertical.

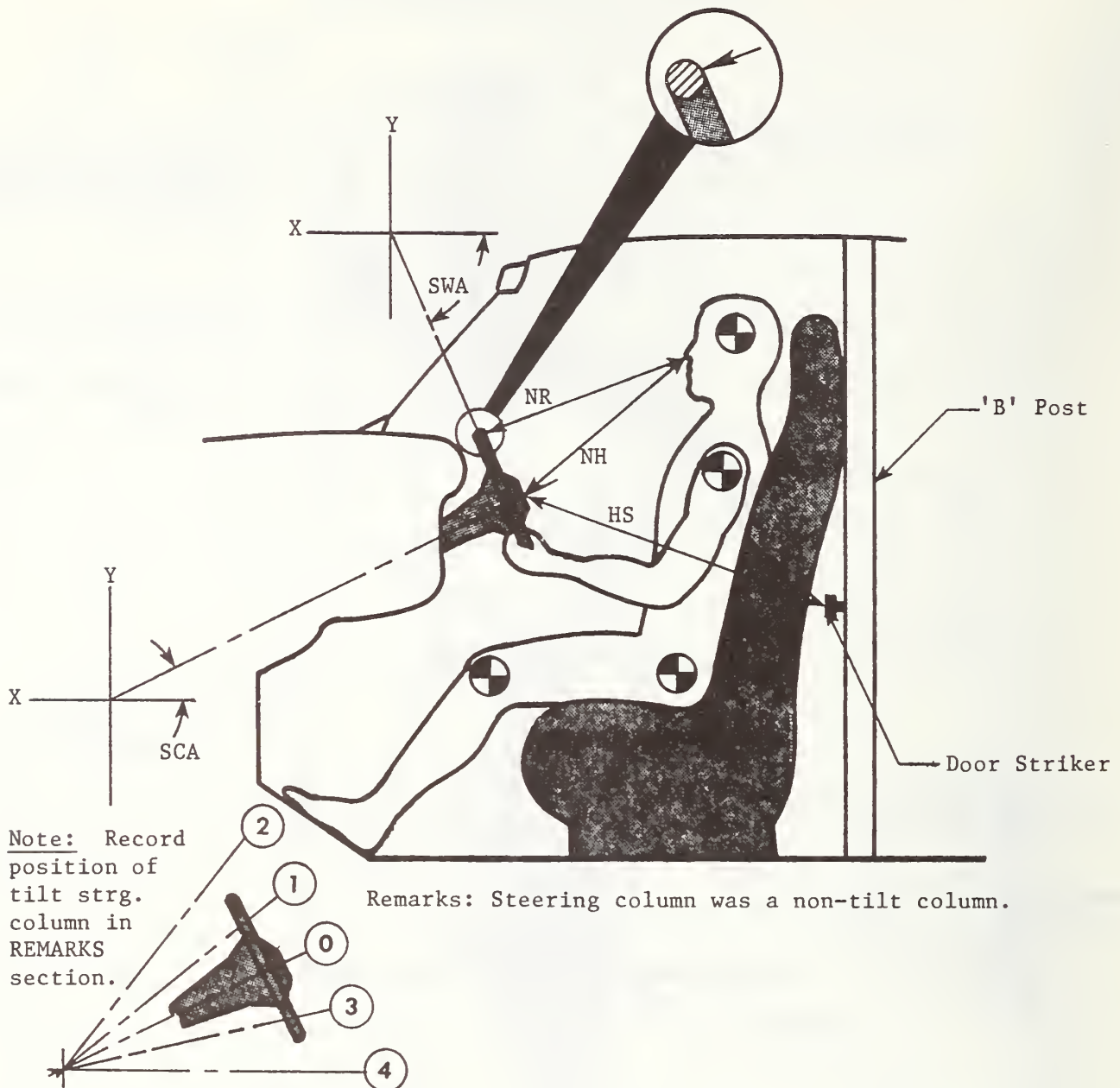
ALL DISTANCE MEASUREMENTS IN INCHES

# SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - Top surface of alum. plate to belt upper edge (in)	13.0	13.9
B - Top surface of alum. plate to belt lower edge (in)	10.3	10.5
C - Dummy centerline to outer edge of belt at chest flesh top (in)	4.6	5.4
D - Dummy centerline to inner edge of belt at chest flesh top (in)	1.3	2.8
SHOULDER BELT TENSION (lbs)	NA	NA

# DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



MEASUREMENTS	
NR - Distance from tip of dummy's nose to top rear surface of steering wheel rim.	14.1
NH - Distance from tip of dummy's nose to center of steering column hub.	14.6
HS - Distance from center of steering column hub to the forward surface of the door lock striker pin.	19.8
SCA - Angle of steering column relative to the horizontal X axis.	26°
SWA - Angle of steering wheel relative to the horizontal X axis.	64°



FMVSS 208 COMFORT AND CONVENIENCE DATA

VEHICLE VIN NO.: 1FAPP2598HT183919

MAKE: Ford MODEL: Escort

VEHICLE BUILD DATE: 6/87 VEHICLE TYPE 5 door hatchback

FRONT OUTBOARD SEATING POSITIONS SEAT BELT TYPE:

(check one): X Automatic belts  
       Type 2 lap/shoulder belts  
       Other

CONVENIENCE HOOKS: NA, vehicle's restraint system did not include convenience hooks.

WEBBING TENSION - RELIEVING DEVICE:

DO OUTBOARD SEATING POSITION BELTS HAVE TENSION - RELIEVING DEVICES?

No

MAXIMUM SLACK RECOMMENDED IN OWNERS MANUAL: NA INCHES

DOES OWNER'S MANUAL WARN THAT INTRODUCING SLACK BEYOND THE AMOUNT SPECIFIED CAN SIGNIFICANTLY REDUCE THE EFFECTIVENESS OF THE SHOULDER BELT?

NA

IF NO, EXPLAIN

AUTOMATIC BELTS: IS TENSION - RELIEVING DEVICE CANCELLED EACH TIME THE ADJACENT DOOR IS OPENED? NA

IF NO, EXPLAIN:

BELT CONTACT FORCE:

FOR BELTS WITHOUT TENSION-RELIEVING DEVICES: BELT CONTACT FORCE:

0.4 POUNDS

LATCHPLATE ACCESS: NA

RETRACTION: NA

ACCESSIBILITY: NA

LATCH MECHANISM: NA

FMVSS NO. 208 - SEAT BELT WARNING SYSTEM DATA

WITH OCCUPANT IN DRIVER'S POSITION AND LAP BELT IN STOWED POSITION AND  
IGNITION SWITCH PLACED IN "START/ON" POSITION:

Duration of audible warning signal = 6 sec.

Duration of reminder light operation = 6 sec.

WITH OCCUPANT IN DRIVER'S POSITION AND LAP BELT IN USE AND THE IGNITION  
SWITCH PLACED IN "START/ON" POSITION:

Duration of audible warning signal - 0 sec.

(Note: audible warning should not operate)

Duration of reminder light operation = 6 sec.

Wording of visual warning:

Fasten Seat Belt \_\_\_\_\_

Fasten Belt \_\_\_\_\_

Symbol 101-80 X

FMVSS NO. 208 - LABELING AND DRIVER'S MANUAL DATA

DESCRIBE LOCATION OF LABEL WHICH DESCRIBES MANUFACTURER'S MAINTENANCE OR REPLACEMENT SCHEDULE FOR CRASH-DEPLOYED OCCUPANT PROTECTION SYSTEM: NA, vehicle did not contain a crash-deployed occupant protection system.

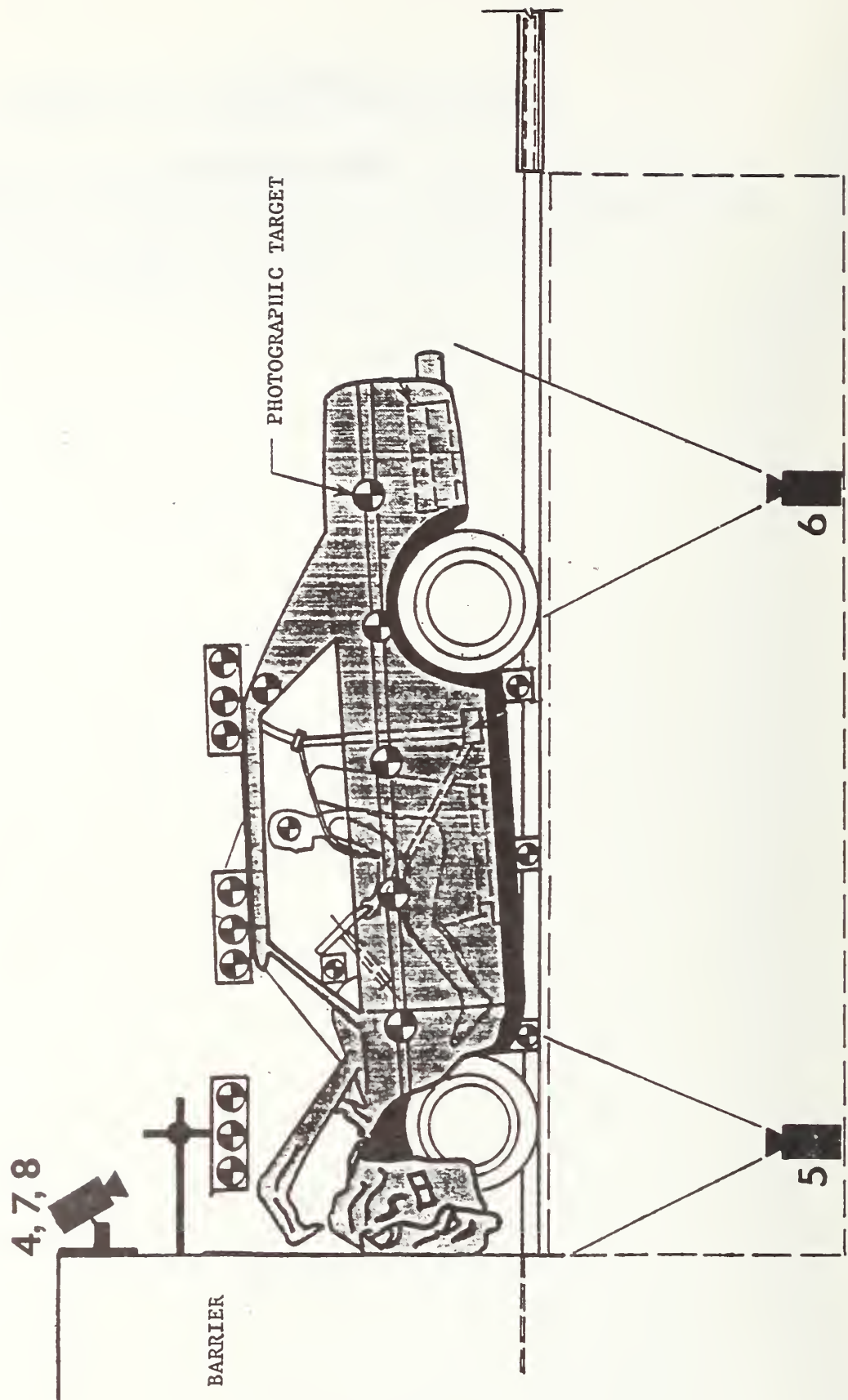
FMVSS NO. 208 - READINESS INDICATOR DATA

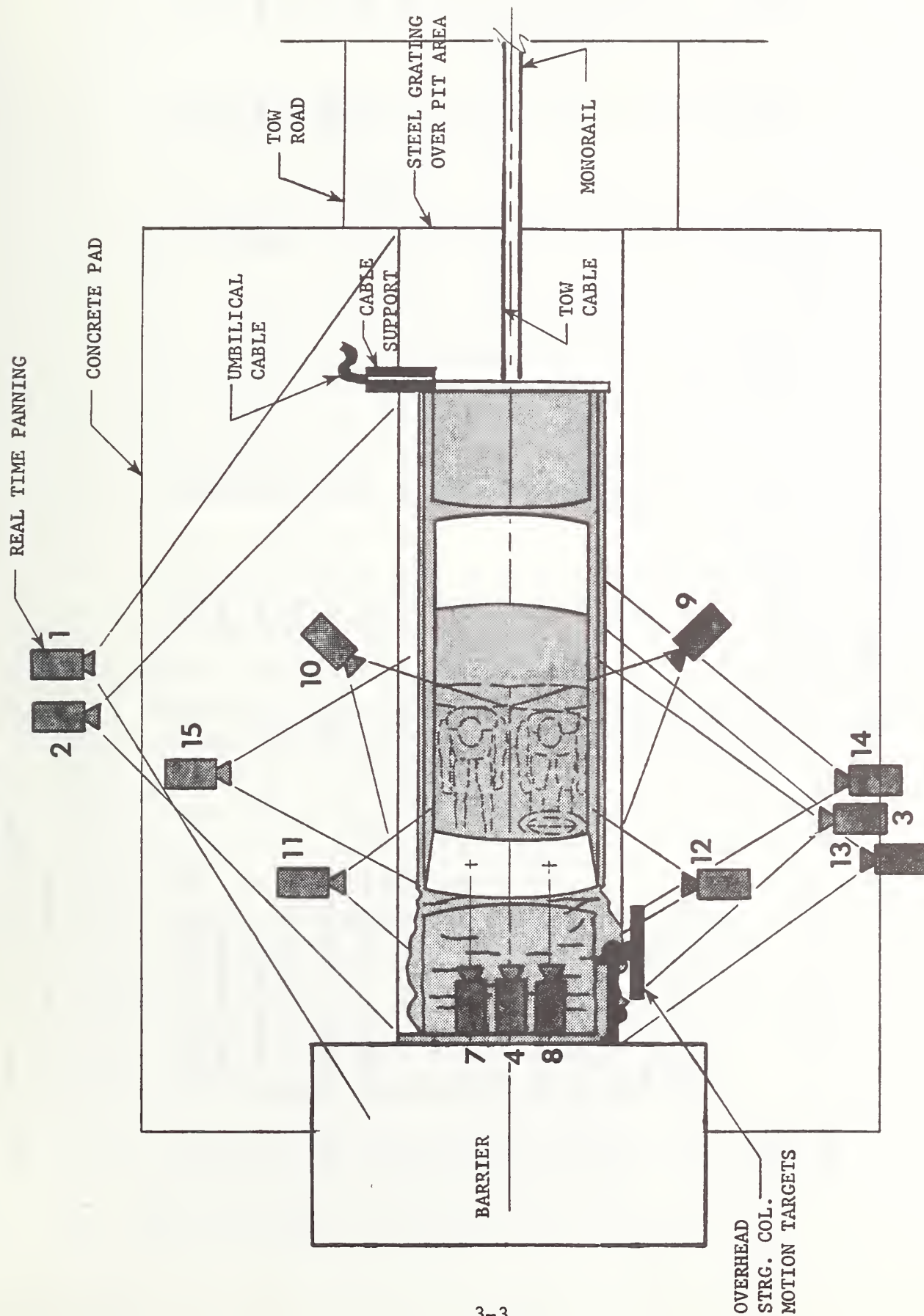
AN OCCUPANT RESTRAINT SYSTEM THAT DEPLOYS IN THE EVENT OF A CRASH SHALL HAVE A MONITORING SYSTEM WITH A READINESS INDICATOR. A TOTALLY MECHANICAL SYSTEM IS EXEMPT FROM THIS REQUIREMENT. NA, vehicle did not contain a crash-deployed occupant protection system.

SECTION 3.0

CAMERA INFORMATION

CAMERA POSITIONS







# HIGH SPEED CAMERA LOCATIONS

TEST NO.: 871216

VEHICLE: Ford Escort

CAMERA NO.	VIEW	CAMERA POSITIONS (IN)*			ANGLE** (DEG)	FILM PLANE		LENS (MM)	SPEED (FPS)
		X	Y	Z		TO HEAD TARGET			
1	Real time panning	-142.0	504.0	61.0	NA	NA	16	24	
2	Vehicle crush	-81.3	266.4	37.1	-2	NA	13	500	
3	Dummy kinematics	-41.5	-295.0	44.0	-4	263.0	25	505	
4	Windshield damage	-6.0	0.0	84.0	40	NA	8.5	502	
5	Crush & fluid spillage	-50.5	0.0	-92.4	90	NA	13	1000	
6	Fluid spillage	-99.3	0.0	-99.0	90	NA	13	1002	
7	Passenger kinematics	-4.5	13.8	93.0	-50	NA	17	500	
8	Driver kinematics	-6.8	-14.5	93.0	-50	NA	17	500	
9	Driver kinematics	-157.3	116.0	87.0	-27	128.5	25	500	
10	Passenger kinematics	-152.1	-116.0	87.0	-26	123.8	25	500	
11	Windshield intrusion	-38.1	306.1	44.0	0	NA	50	502	
12	Windshield intrusion	-53.0	-309.4	42.3	0	NA	50	502	
13	Column movement	-91.5	-286.0	103.0	-14	NA	25	498	
14	Column movement	-91.5	-286.0	75.1	-9	NA	25	500	
15	Passenger kinematics	-38.8	293.0	45.3	-4	261.3	25	502	

\*X = Film plane to plane of barrier face

Y = Film plane to monorail centerline

Z = Film plane to ground

\*\*Referenced to horizontal plane



## APPENDIX A

### PHOTOGRAPHS

1. PRE-TEST FRONT VIEW
2. POST-TEST FRONT VIEW
3. PRE-TEST LEFT SIDE VIEW
4. POST-TEST LEFT SIDE VIEW
5. PRE-TEST RIGHT SIDE VIEW
6. POST-TEST RIGHT SIDE VIEW
7. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW
8. POST-TEST RIGHT FRONT THREE-QUARTER VIEW
9. PRE-TEST LEFT REAR THREE-QUARTER VIEW
10. POST-TEST LEFT REAR THREE-QUARTER VIEW
11. PRE-TEST REAR VIEW
12. POST-TEST REAR VIEW
13. PRE-TEST WINDSHIELD VIEW
14. POST-TEST WINDSHIELD VIEW
15. PRE-TEST ENGINE COMPARTMENT VIEW
16. POST-TEST ENGINE COMPARTMENT VIEW
17. PRE-TEST FRONT UNDERBODY VIEW
18. POST-TEST FRONT UNDERBODY VIEW
19. PRE-TEST REAR UNDERBODY VIEW
20. POST-TEST REAR UNDERBODY VIEW
21. PRE-TEST DRIVER DUMMY POSITION VIEW
22. POST-TEST DRIVER DUMMY POSITION VIEW
23. PRE-TEST PASSENGER DUMMY POSITION VIEW
24. POST-TEST PASSENGER DUMMY POSITION VIEW
25. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1
26. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2
27. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1
28. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2
29. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1
30. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2
31. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1
32. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2
33. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 1

APPENDIX A CONTINUED

PHOTOGRAPHS

- 34. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 2
- 35. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 3
- 36. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 4
- 37. POST-TEST PASSENGER DUMMY HEAD/KNEE CONTACT - VIEW 1
- 38. POST-TEST PASSENGER DUMMY HEAD/KNEE CONTACT - VIEW 2
- 39. PRE-TEST VEHICLE CERTIFICATION LABEL VIEW
- 40. PRE-TEST VEHICLE TIRE LOAD LABEL VIEW



Figure A-1. PRE-TEST FRONT VIEW

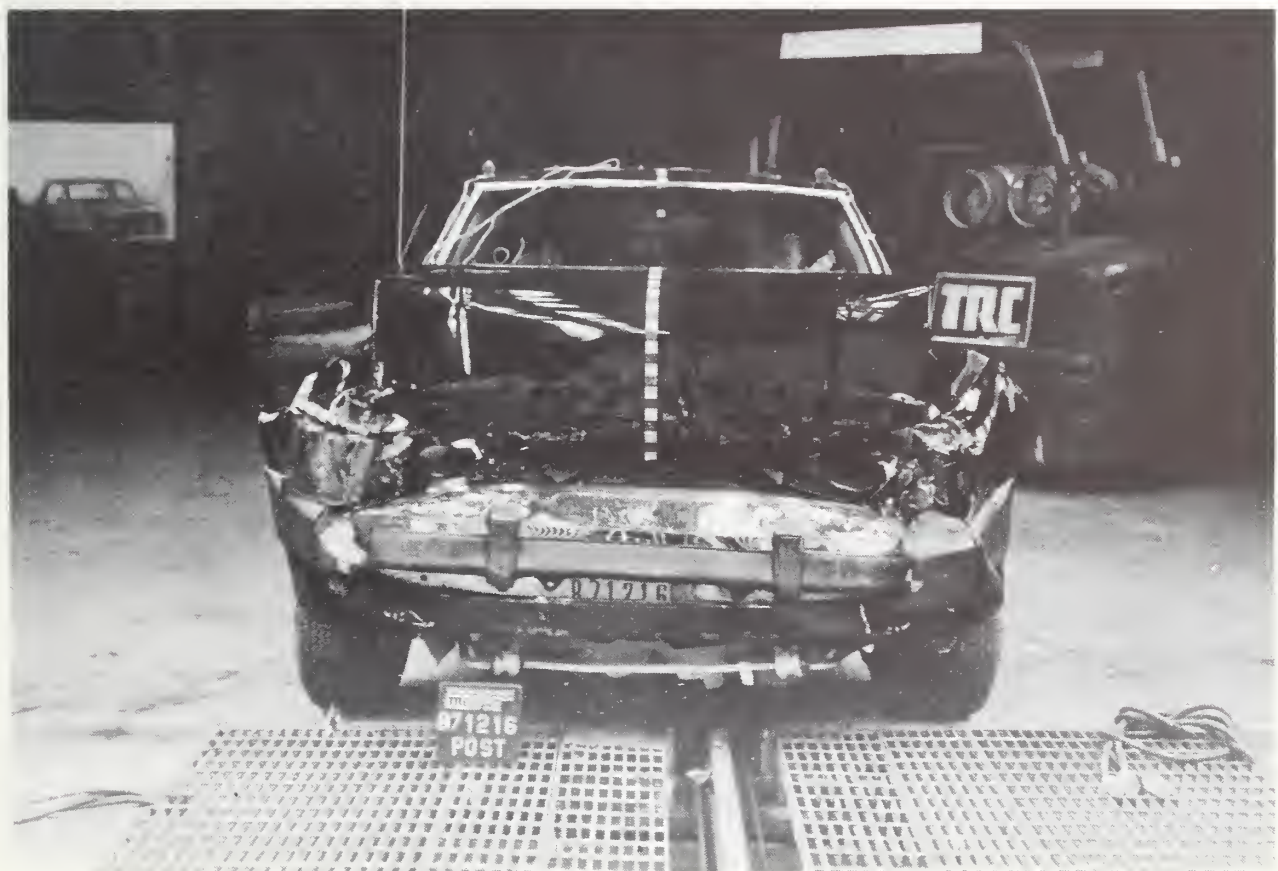


Figure A-2. POST-TEST FRONT VIEW  
A-3



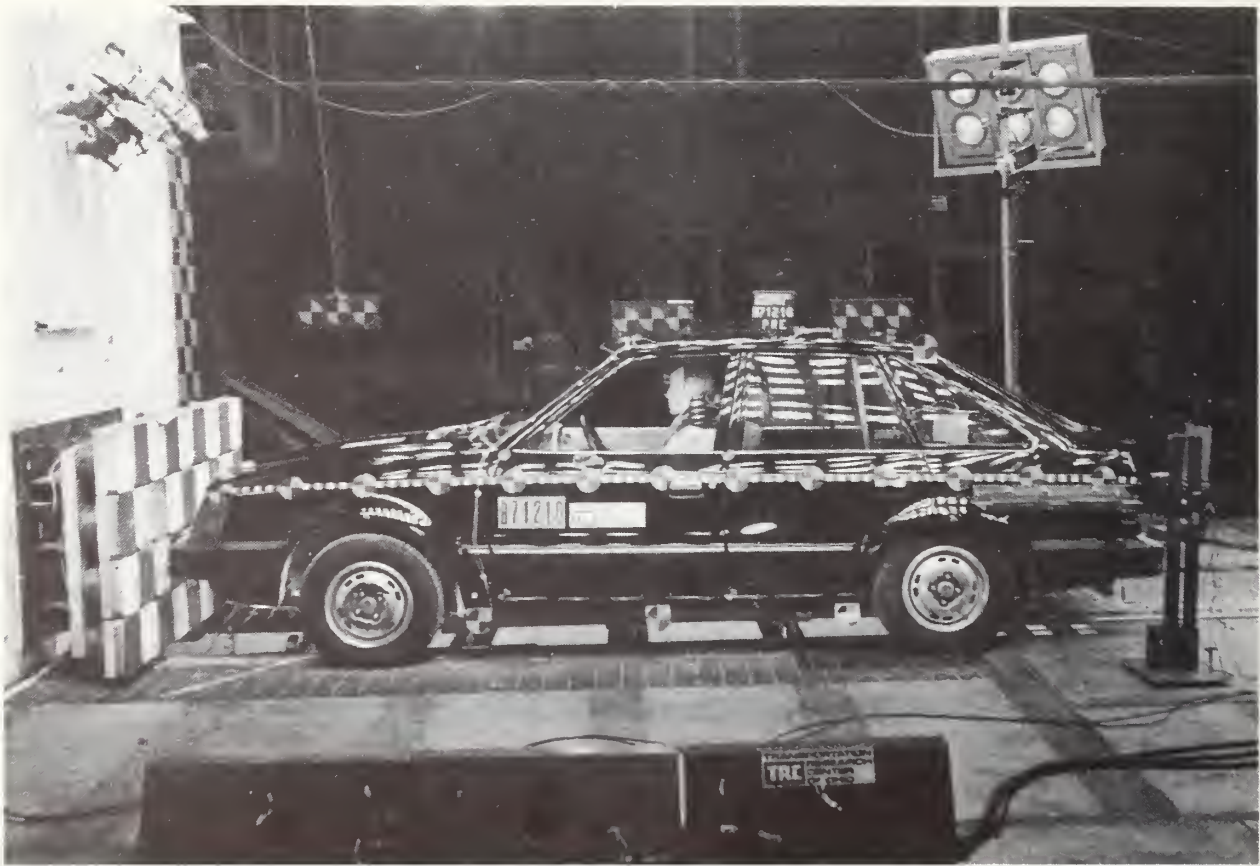


Figure A-3. PRE-TEST LEFT SIDE VIEW

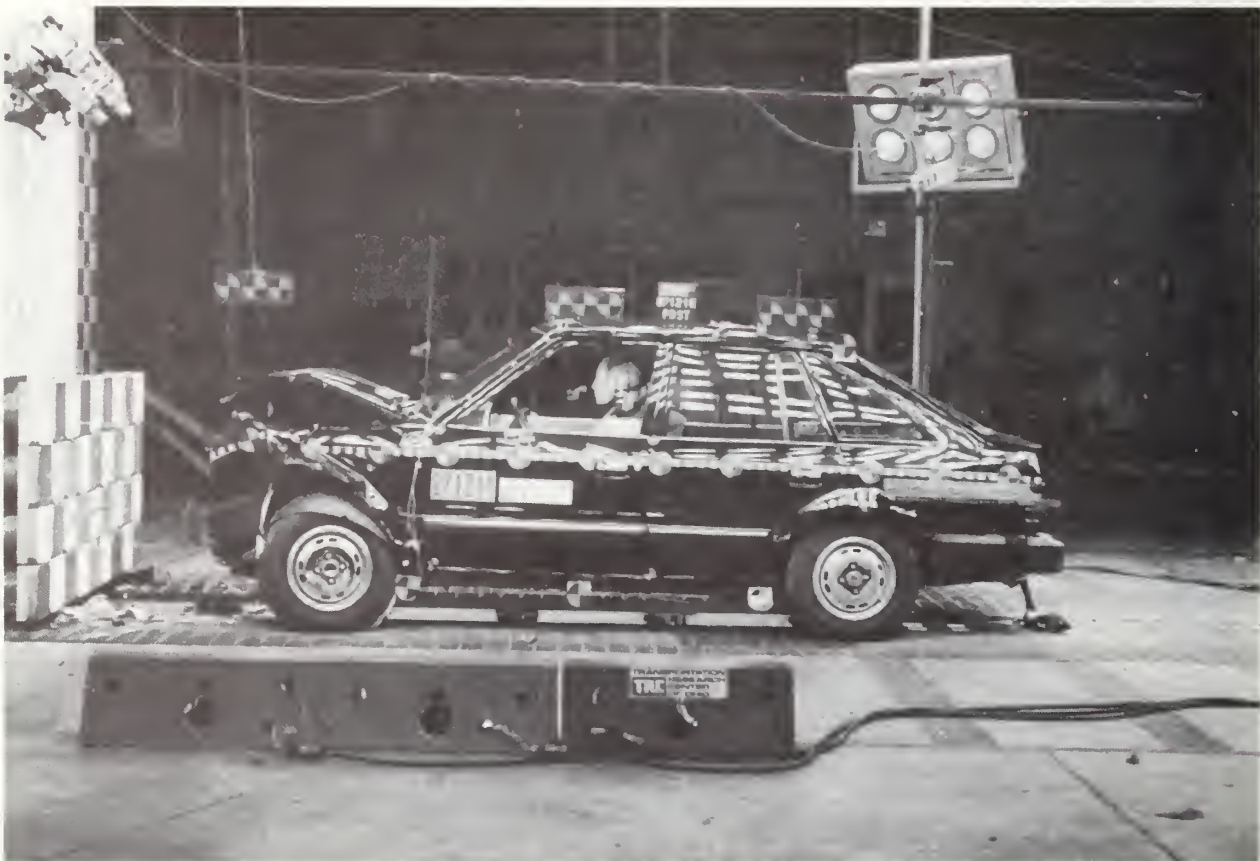


Figure A-4. POST-TEST LEFT SIDE VIEW  
A-4



Figure A-5. PRE-TEST RIGHT SIDE VIEW

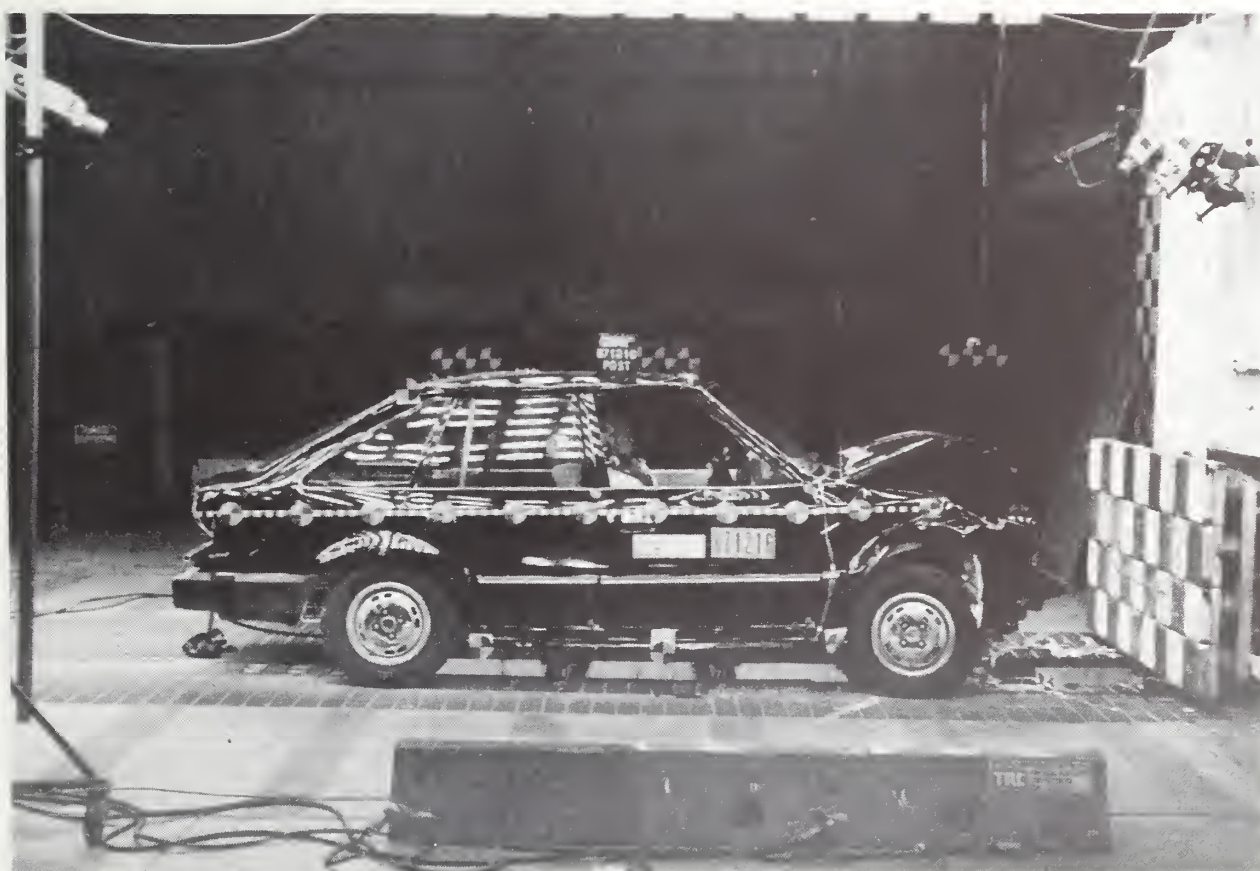


Figure A-6. POST-TEST RIGHT SIDE VIEW





Figure A-7. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-8. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

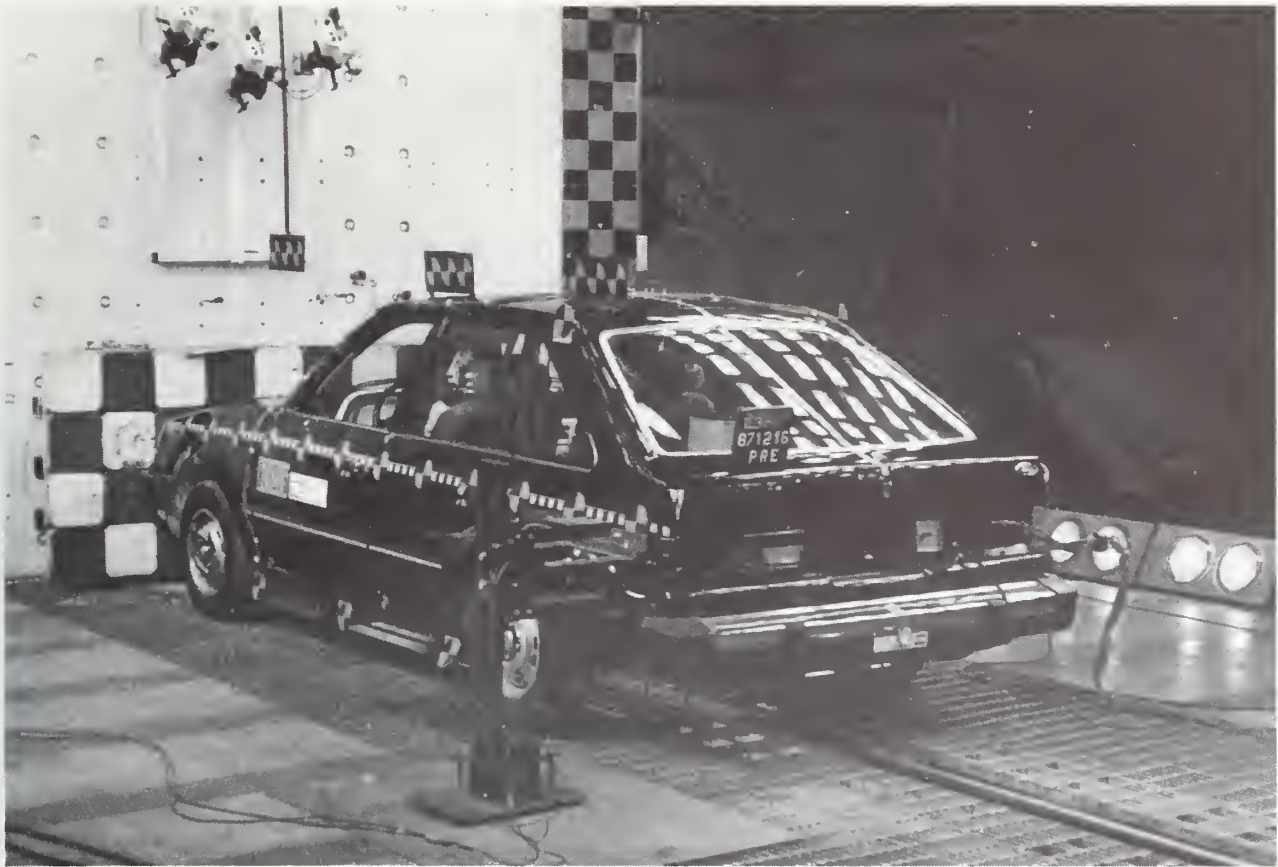


Figure A-9. PRE-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-10. POST-TEST LEFT REAR THREE-QUARTER VIEW  
A-7



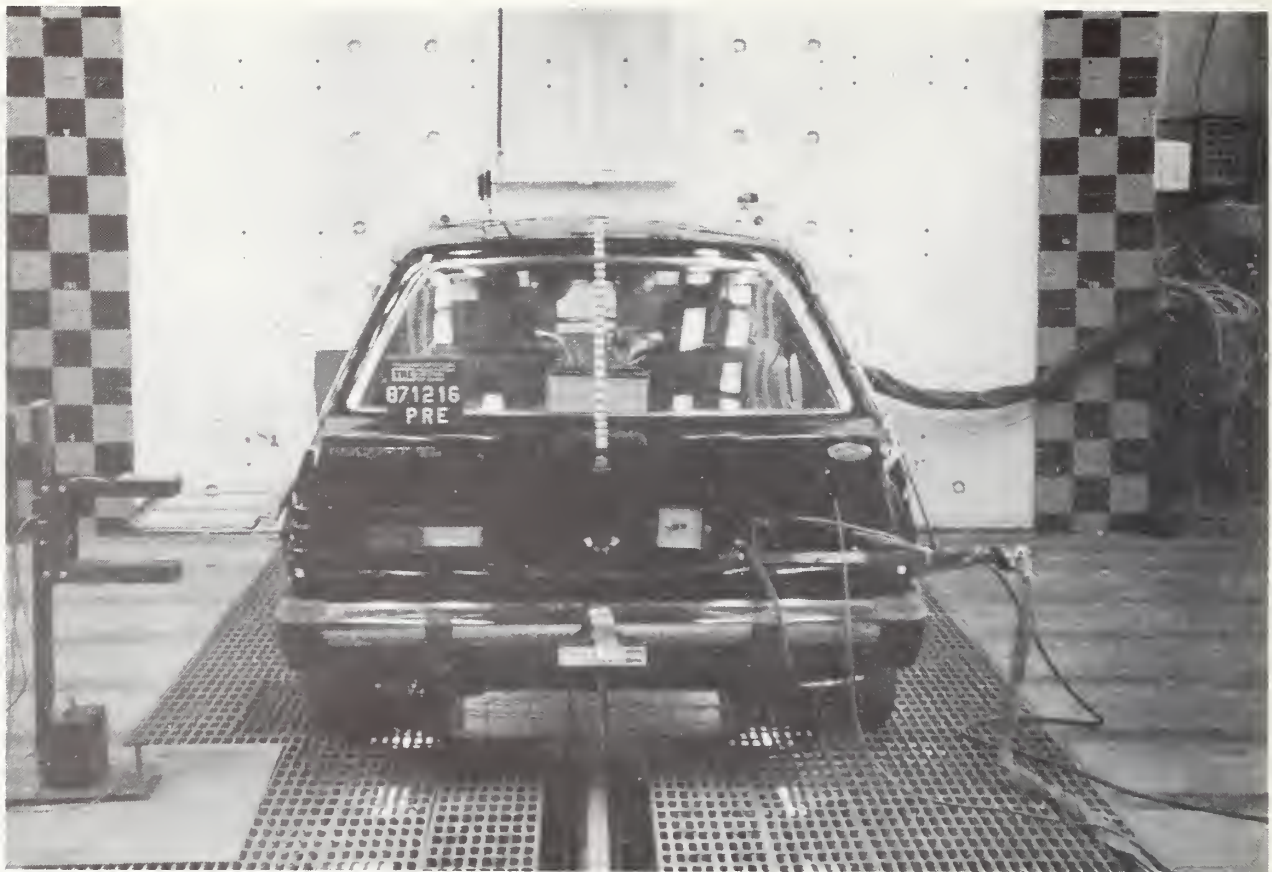


Figure A-11. PRE-TEST REAR VIEW

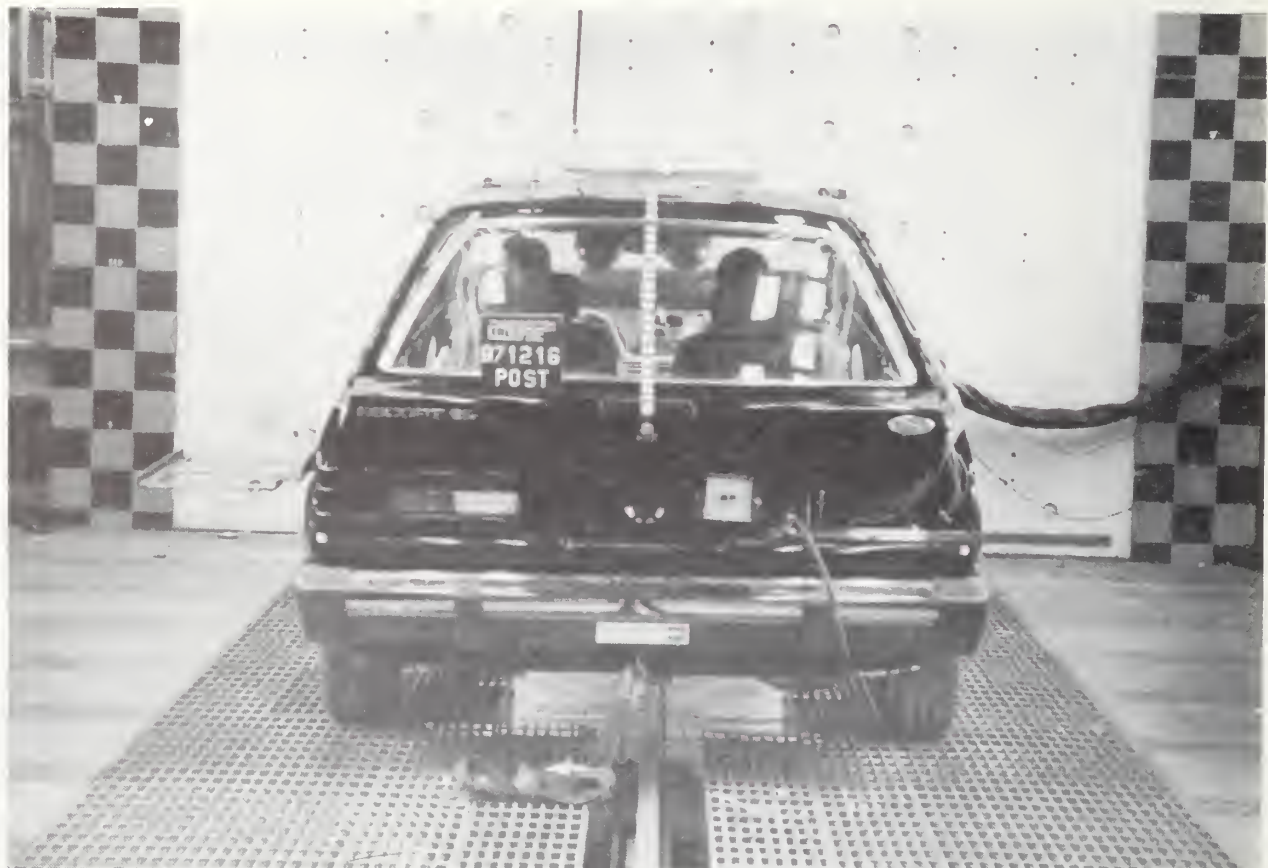


Figure A-12. POST-TEST REAR VIEW  
A-8



Figure A-13. PRE-TEST WINDSHIELD VIEW

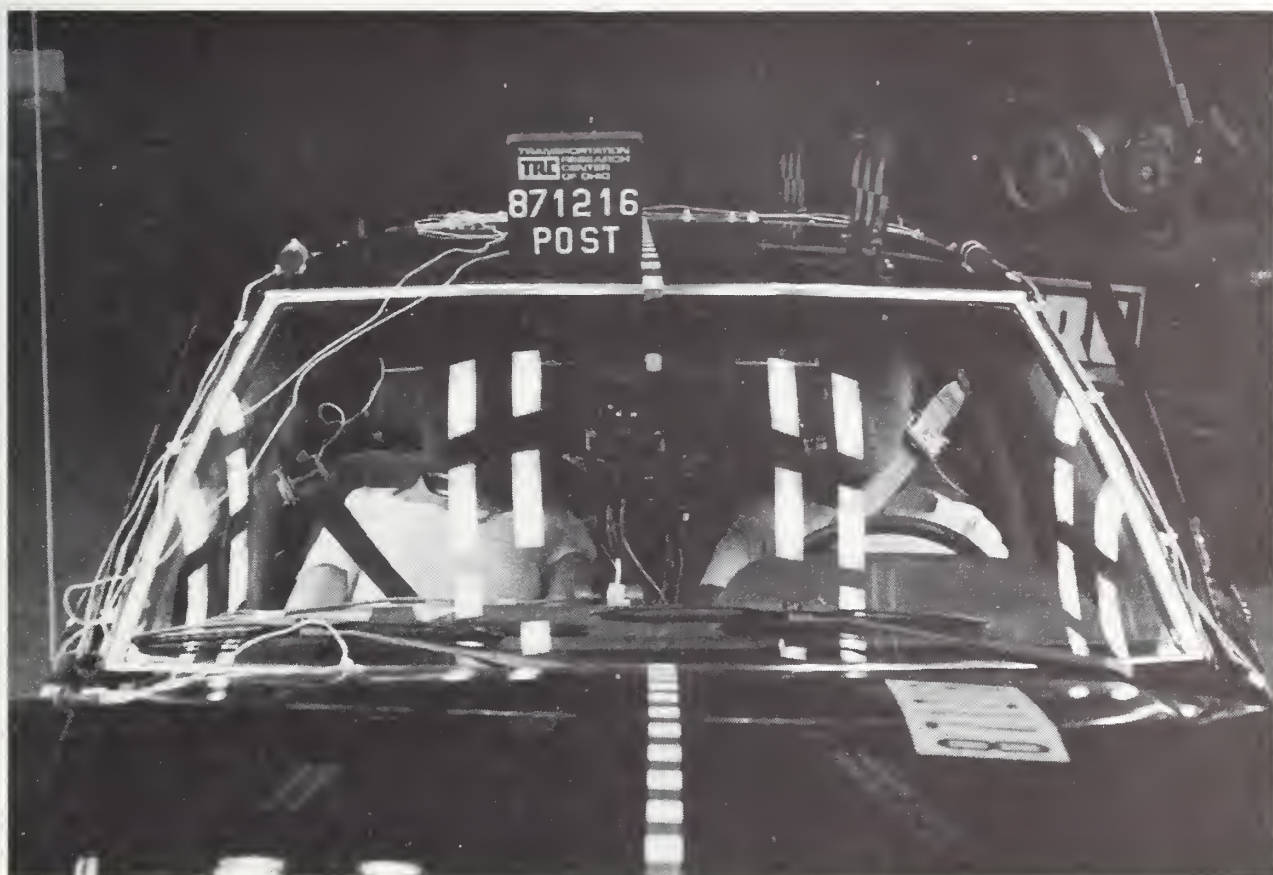


Figure A-14. POST-TEST WINDSHIELD VIEW  
A-9



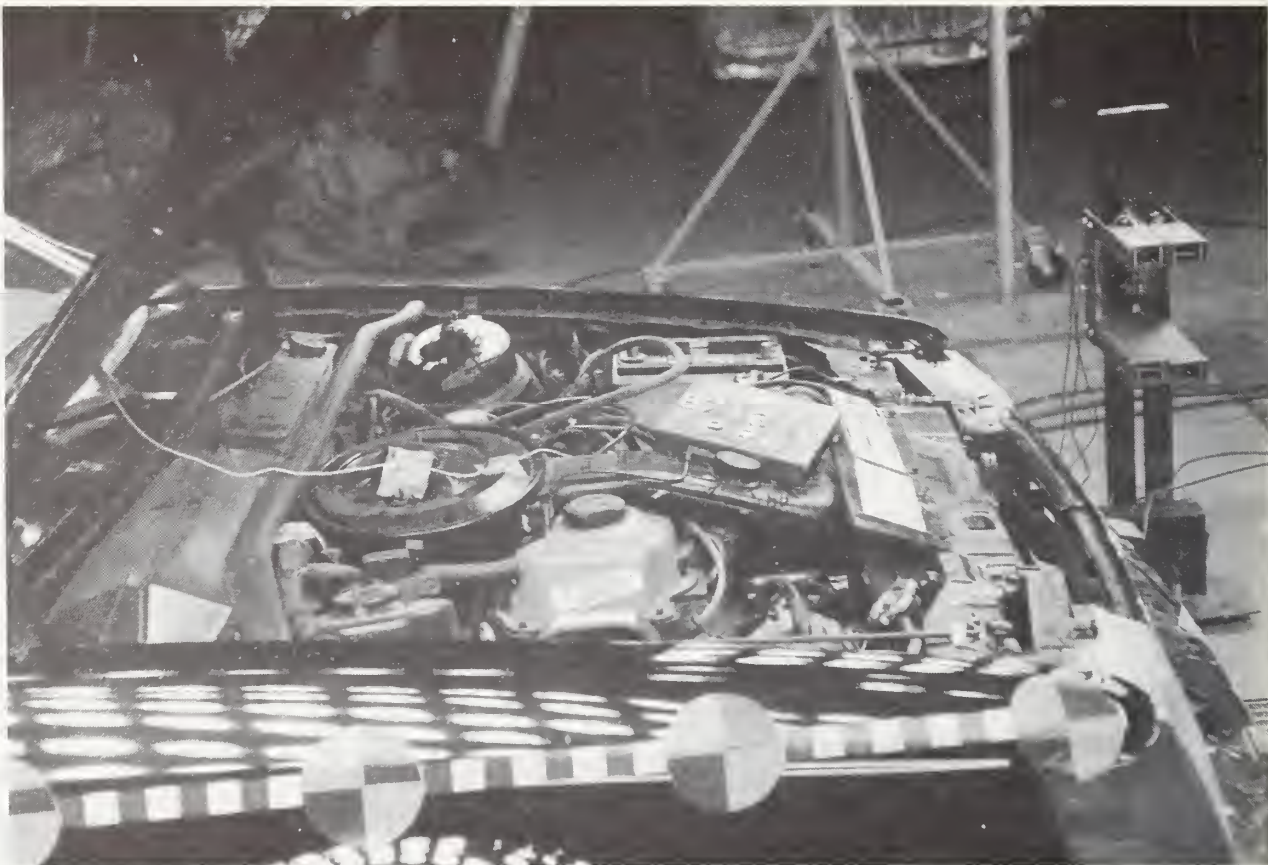


Figure A-15. PRE-TEST ENGINE COMPARTMENT VIEW



Figure A-16. POST-TEST ENGINE COMPARTMENT VIEW



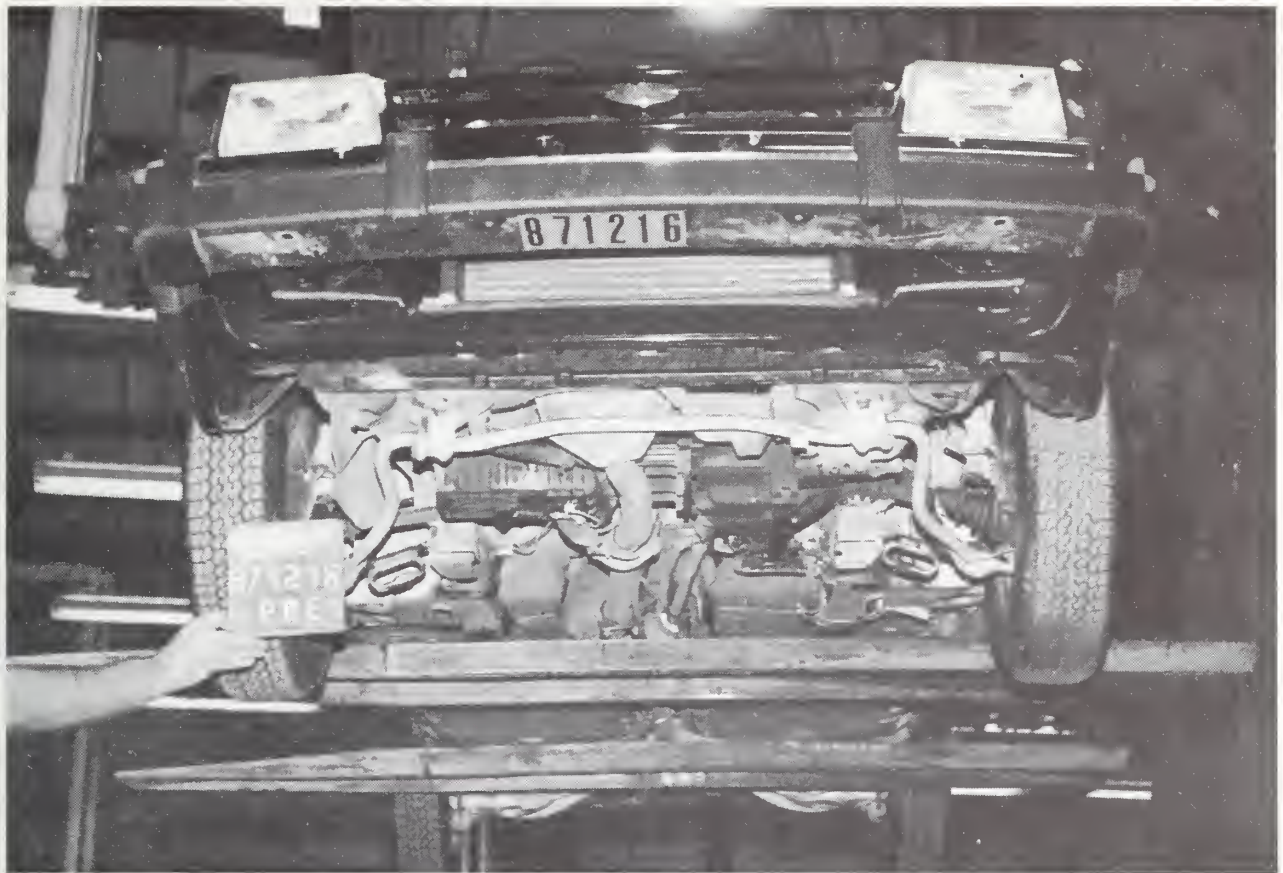


Figure A-17. PRE-TEST FRONT UNDERBODY VIEW

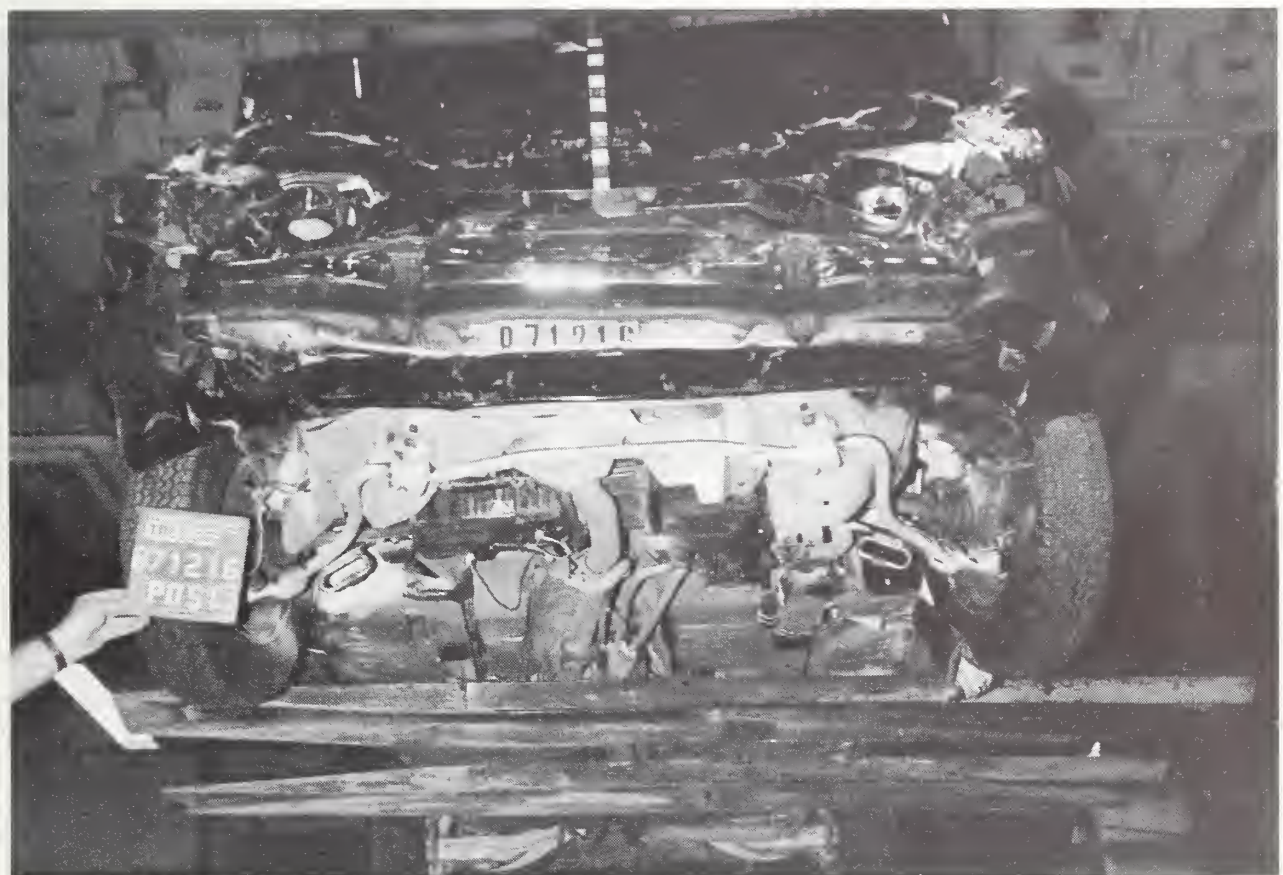


Figure A-18. POST-TEST FRONT UNDERBODY VIEW  
A-11



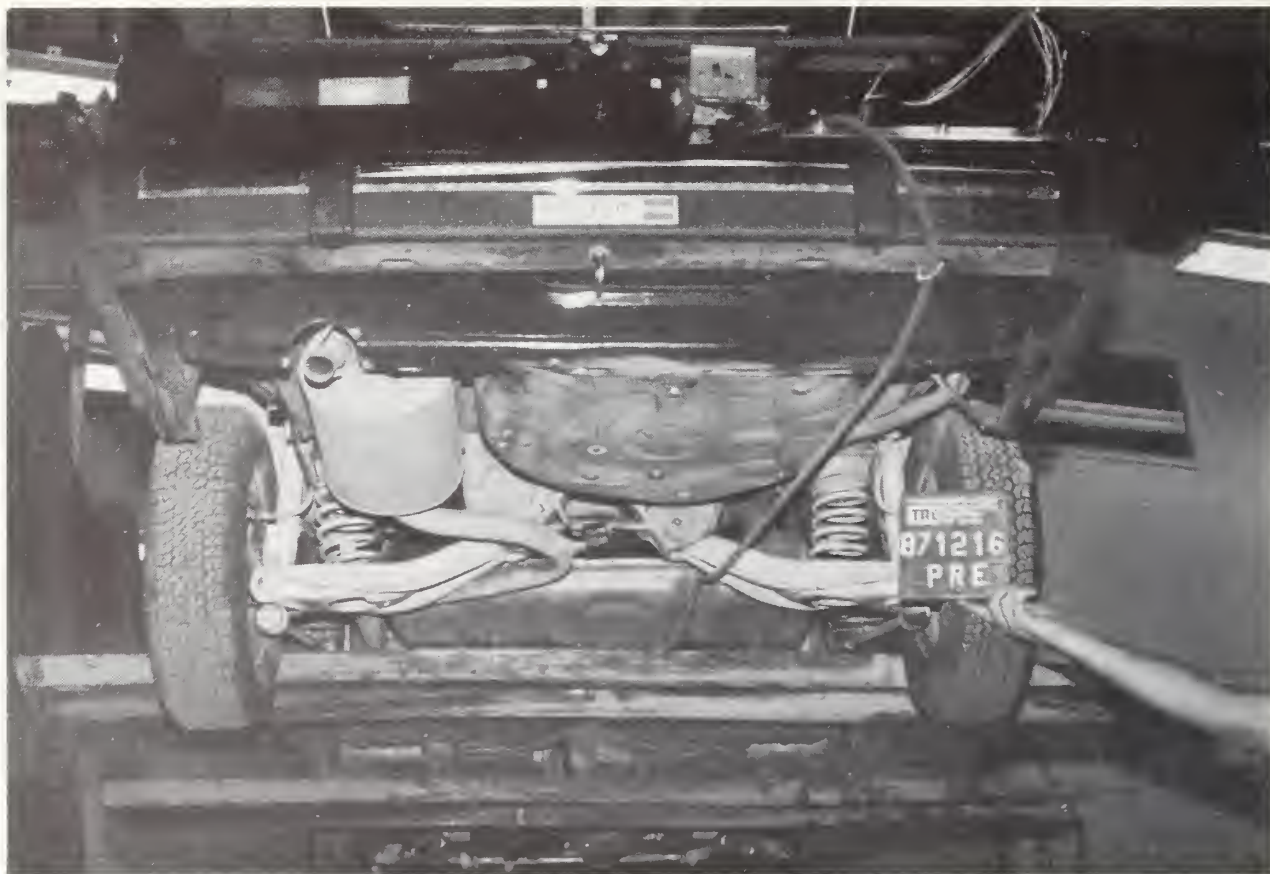


Figure A-19. PRE-TEST REAR UNDERBODY VIEW

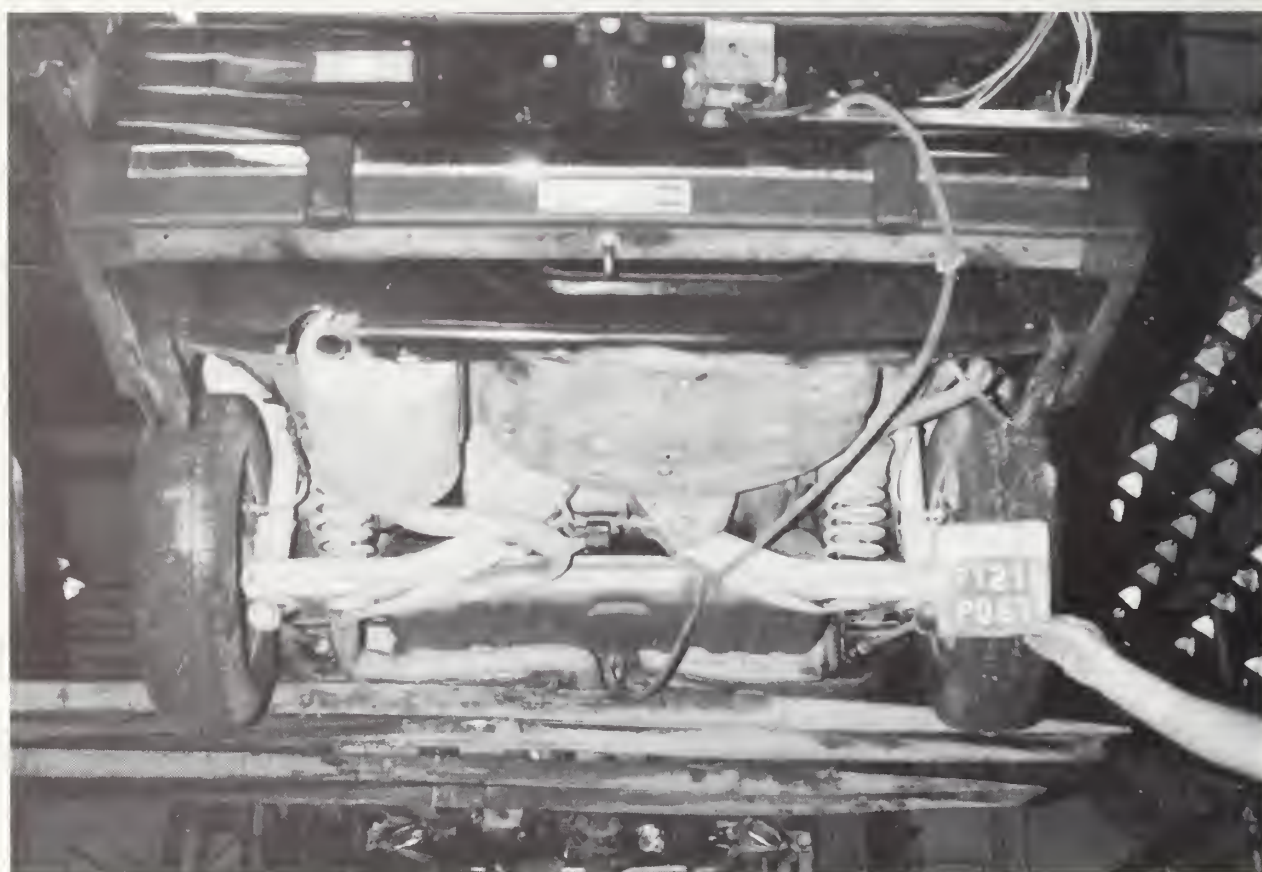


Figure A-20. POST-TEST REAR UNDERBODY VIEW





Figure A-21. PRE-TEST DRIVER DUMMY POSITION VIEW



Figure A-22. POST-TEST DRIVER DUMMY POSITION VIEW





Figure A-23. PRE-TEST PASSENGER DUMMY POSITION VIEW



Figure A-24. POST-TEST PASSENGER DUMMY POSITION VIEW





Figure A-25. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

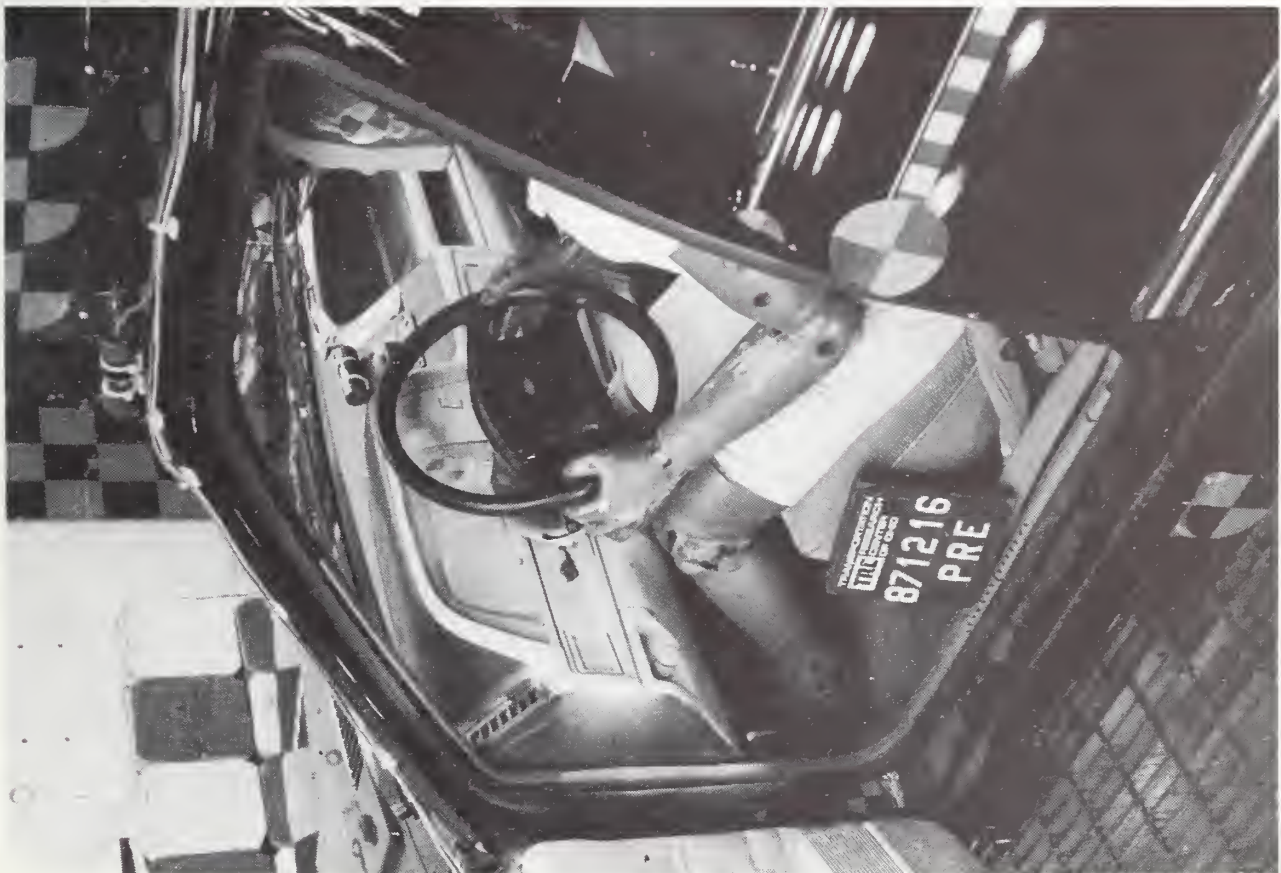


Figure A-26. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2



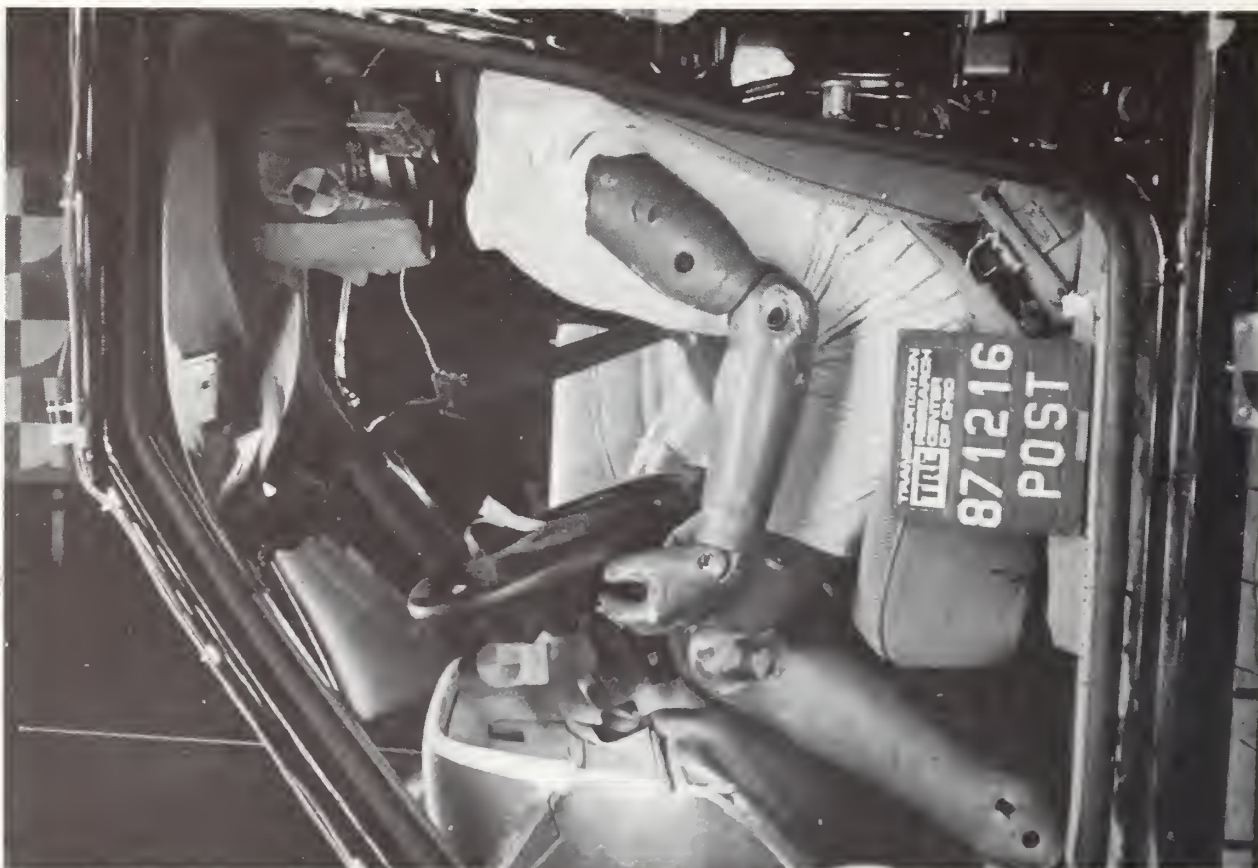


Figure A-27. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1



Figure A-28. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2



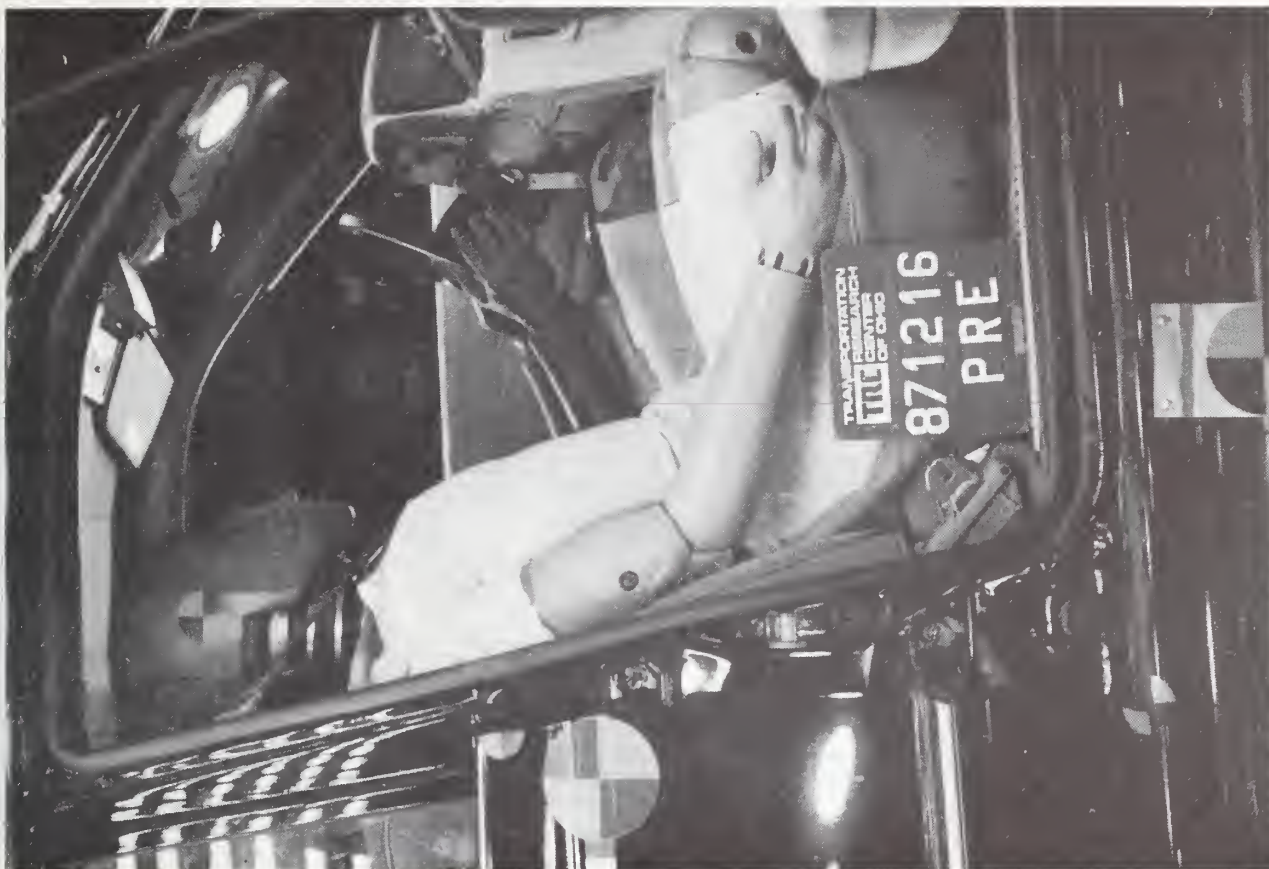


Figure A-29. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1



Figure A-30. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2





Figure A-31. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

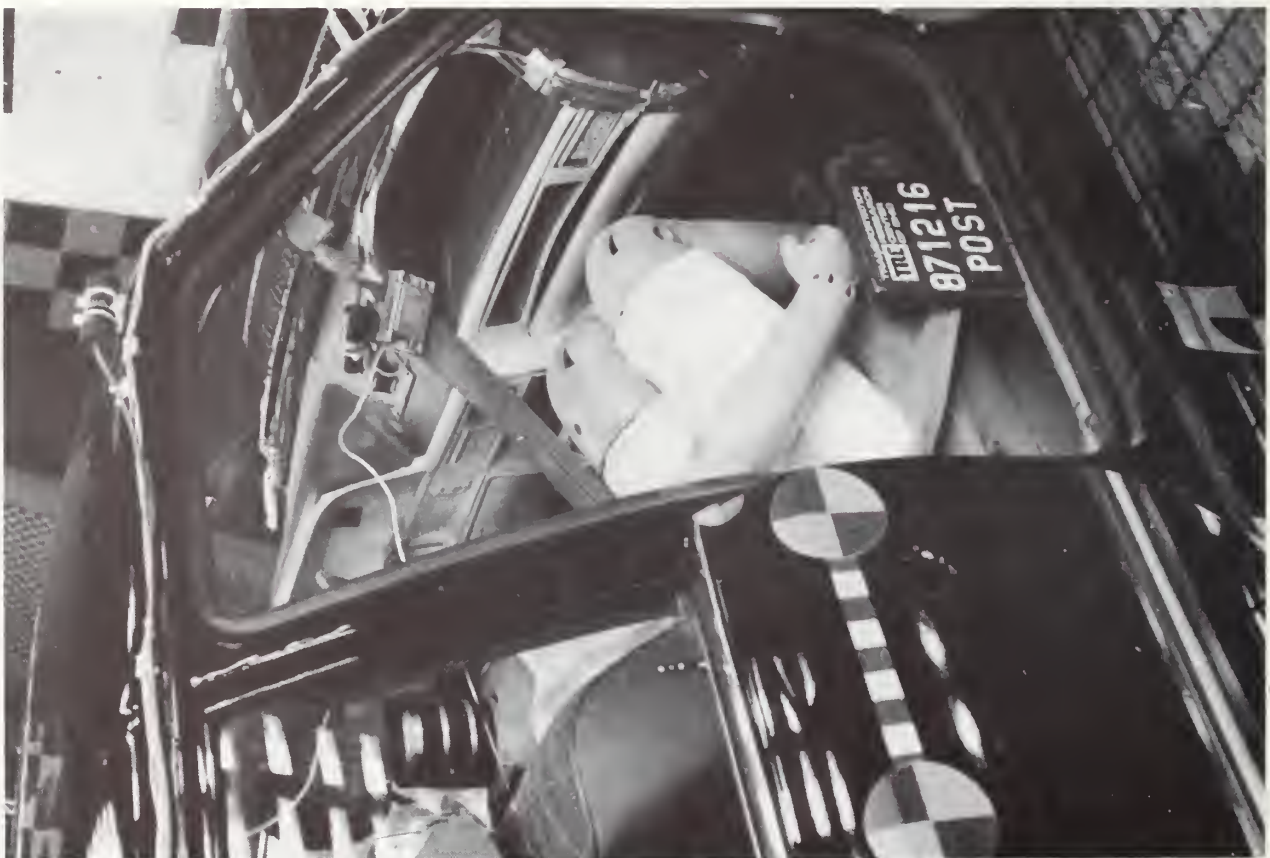


Figure A-32. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2



Figure A-33. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 1



Figure A-34. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 2





Figure A-35. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 3



Figure A-36. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 4



Figure A-37. POST-TEST PASSENGER DUMMY/KNEE CONTACT - VIEW 1



Figure A-38. POST-TEST PASSENGER DUMMY/KNEE CONTACT - VIEW 2



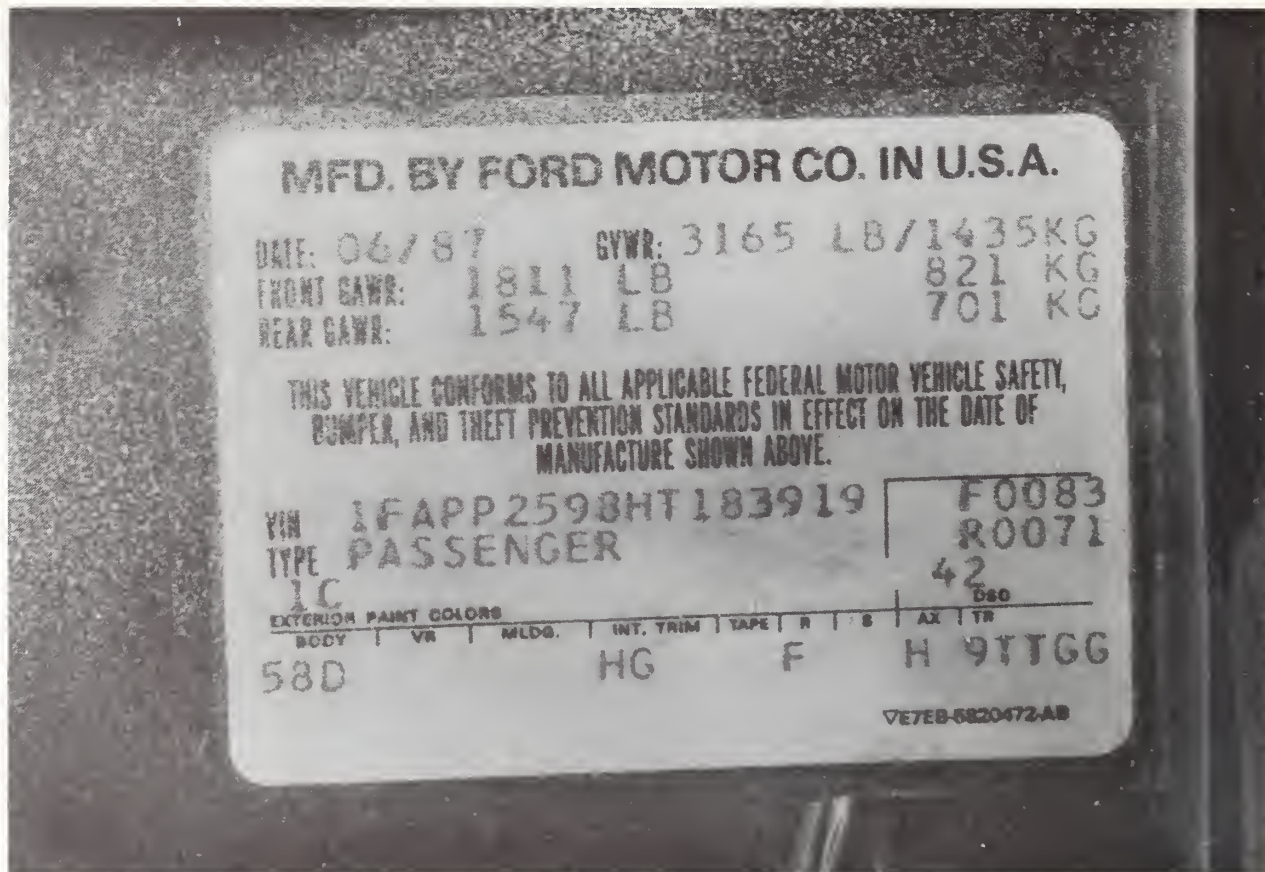


Figure A-39. PRE-TEST VEHICLE CERTIFICATION LABEL VIEW

ESCORT/LYNX		RECOMMENDED TIRE SIZE and INFLATION PRESSURE (COLD)		3	
MODELS	TIRE SIZE (LOAD RANGE C & D TIRES NOT PERMISSIBLE)	LOAD RANGE	FRONT & REAR PRESSURE		
			SEDANS	4 DR. LIFT GATE	
ALL EXCEPT SPORTS OPTION	P165/80R13	STD	30 PSI 207 kPa	30 PSI 207 kPa	
	P175/80R13	STD	35 PSI 240 kPa		
SPORTS OPTION ONLY	P195/60HR15*	STD	30 PSI 207 kPa		
ALL	P155/80D13 TEMPORAL SPARE	STD	35 PSI 240 kPa	35 PSI 240 kPa	
* REPLACE WITH IDENTICAL ORIGINAL EQUIPMENT BRAND (GOODYEAR), SIZE, CONSTRUCTION TYPE AND SPEED RATED TIRE—REFER TO OWNER'S GUIDE.					
TOTAL LOAD = OCCUPANTS PLUS LUGGAGE					
MODEL	MAXIMUM LOAD	TOTAL OCCUPANTS	DISTRIBUTION		
			FRONT	REAR	LUGGAGE
SEDANS	650 lb/295 kg	4	2	2	50 lb/23 kg
4 DR. LIFT GATE	750 lb/340 kg	4	2	2	150 lb/68 kg
FOR SUSTAINED HIGH SPEED, TRAILER TOWING, RECREATIONAL ACCESSORIES, OR TEMPORAL SPARE INFORMATION—SEE OWNER'S GUIDE					▽ E7EC-1532-AC

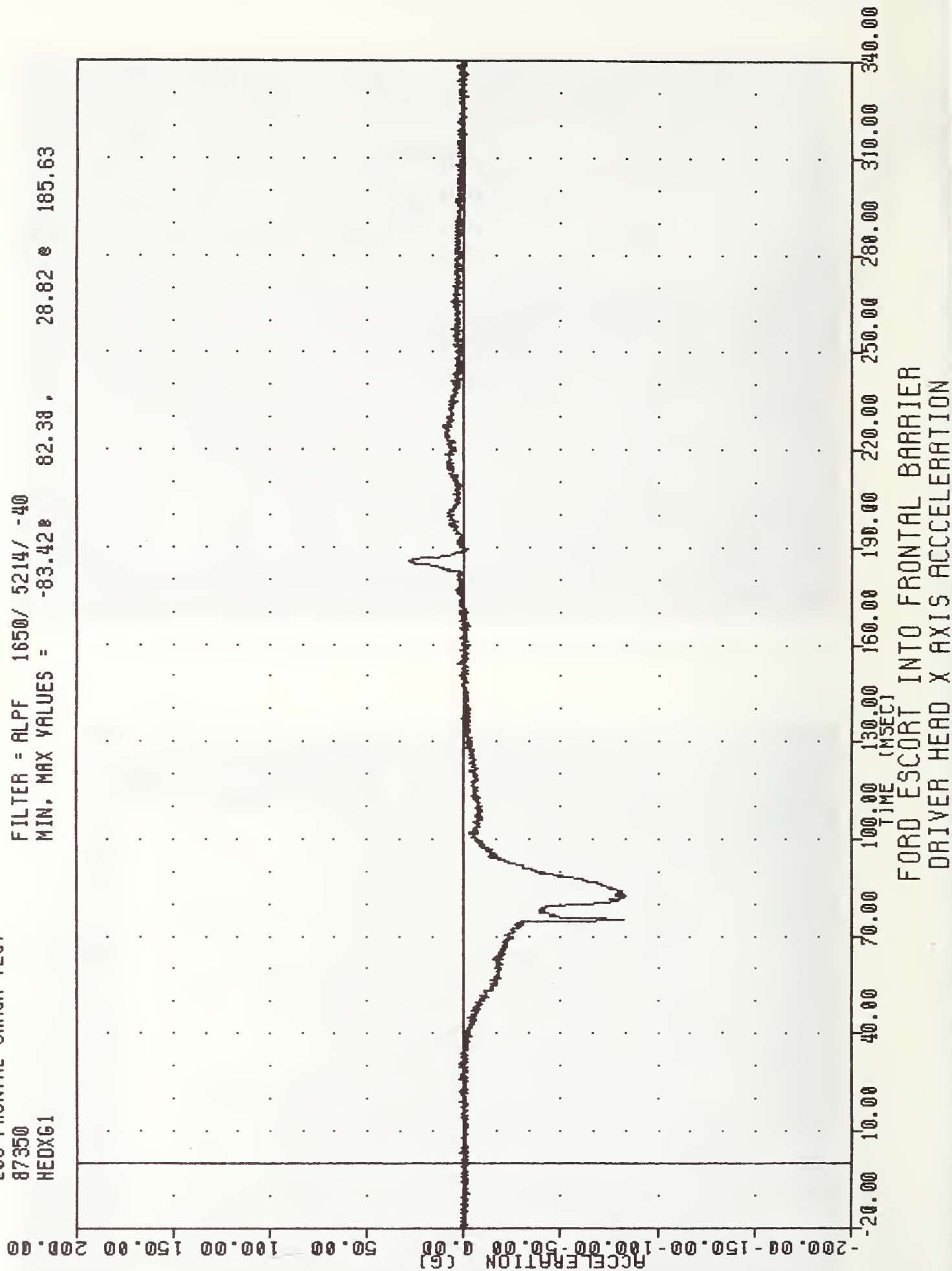
Figure A-40. PRE-TEST VEHICLE TIRE LOAD LABEL VIEW

APPENDIX B

DATA PLOTS

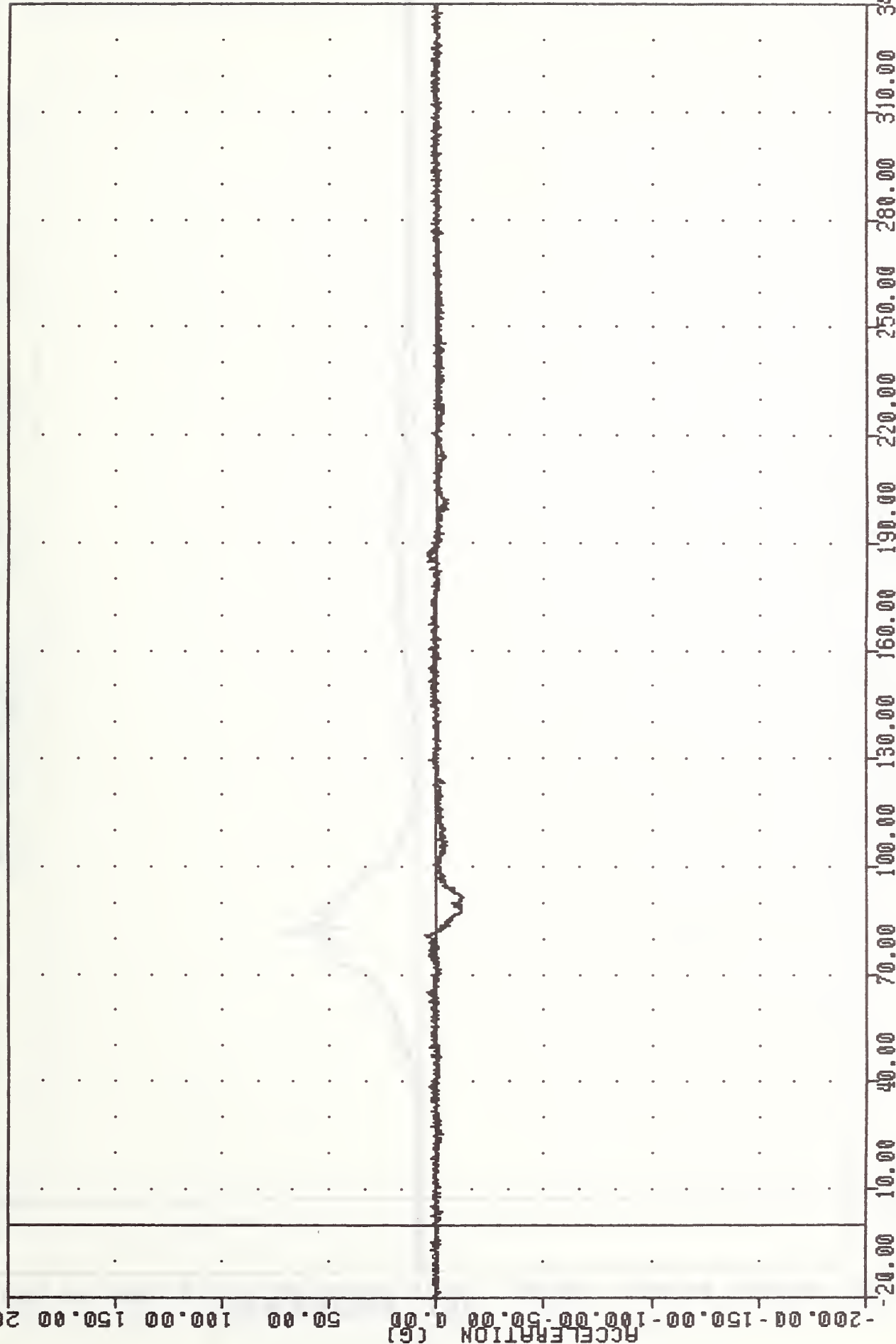
TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 HEDXG1

FILTER = ALPF 1650/ 5214/ -40  
 MIN, MAX VALUES = -83.42 82.38 , 28.82 185.63



TRC . 871216  
 200 FRONTAL CRASH TEST  
 87350  
 HEDYG1

FILTER = ALPF 1650/ 5214/ -40  
 MIN, MAX VALUES = -12.00 5.42 80.75

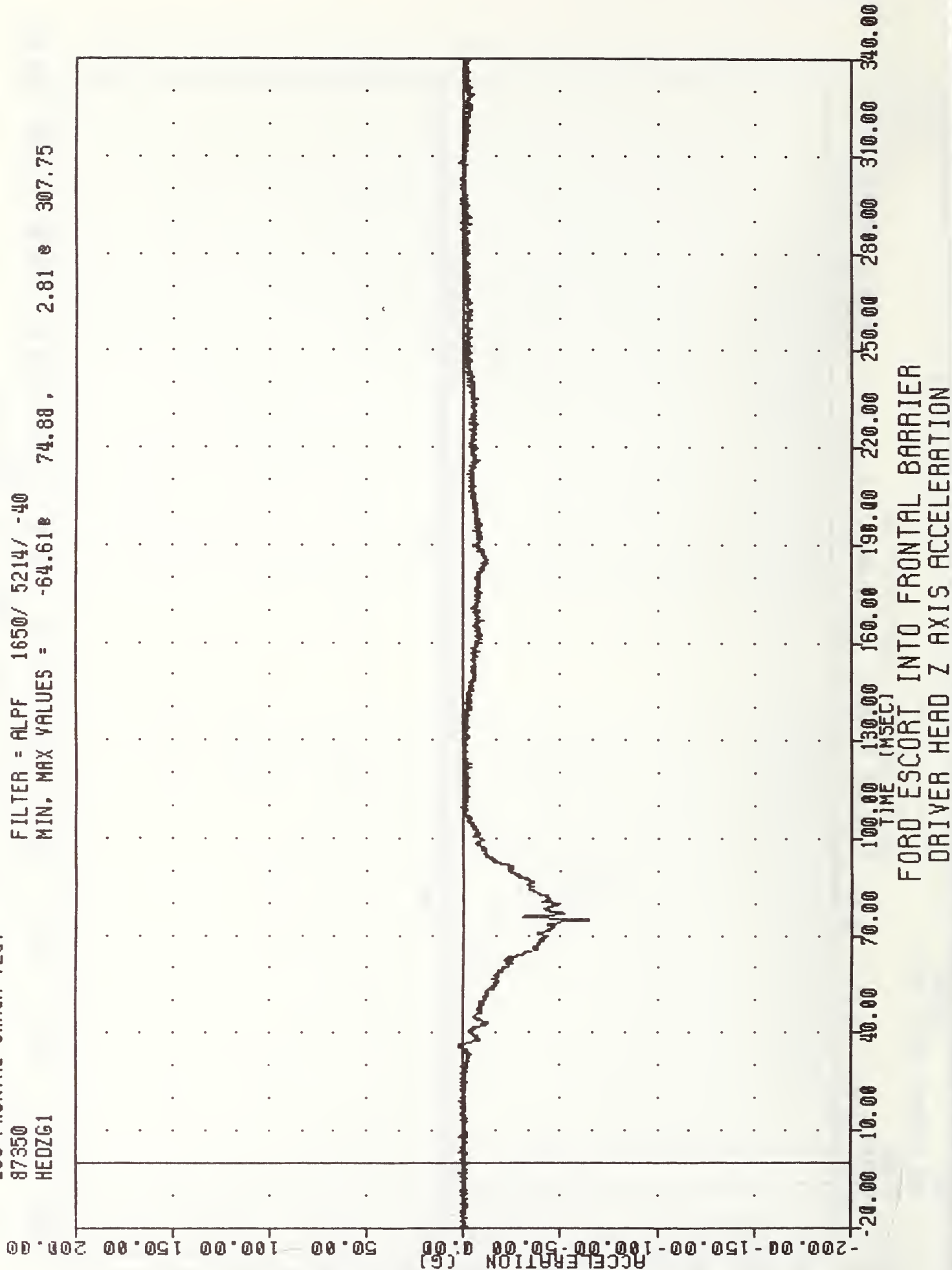


FORD ESCORT INTO FRONTAL BARRIER  
 DRIVER HEAD Y AXIS ACCELERATION



TRC , 871216  
208 FRONTAL CRASH TEST  
87350  
HEDZG1

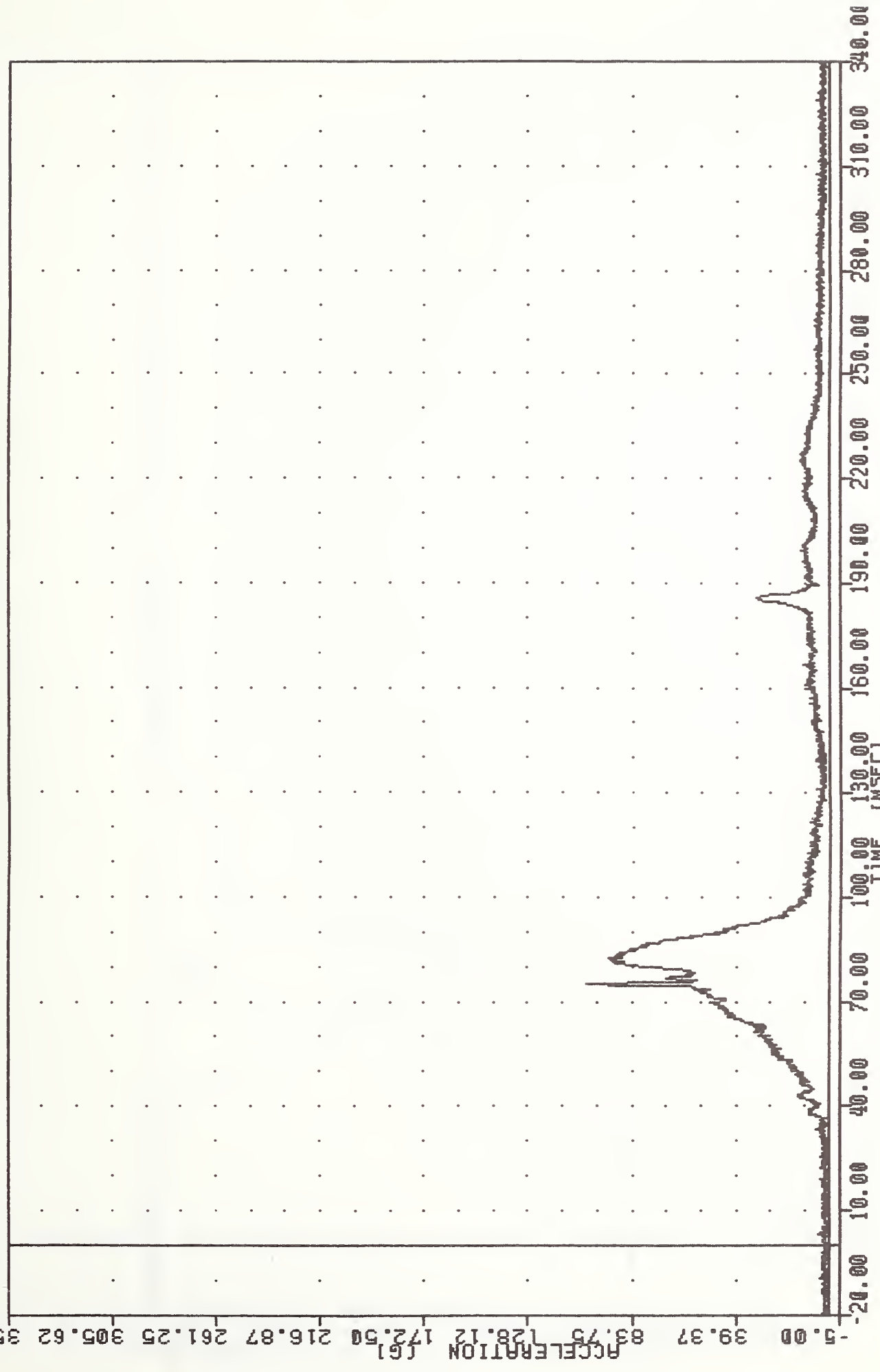
FILTER = ALPF 1650/ 5214/ -40  
MIN, MAX VALUES = -64.61 74.88, 2.81 307.75



FORD ESCORT INTO FRONTAL BARRIER  
DRIVER HEAD Z AXIS ACCELERATION

TRC , 871216  
200 FRONTAL CRASH TEST  
87350  
HEDRG1

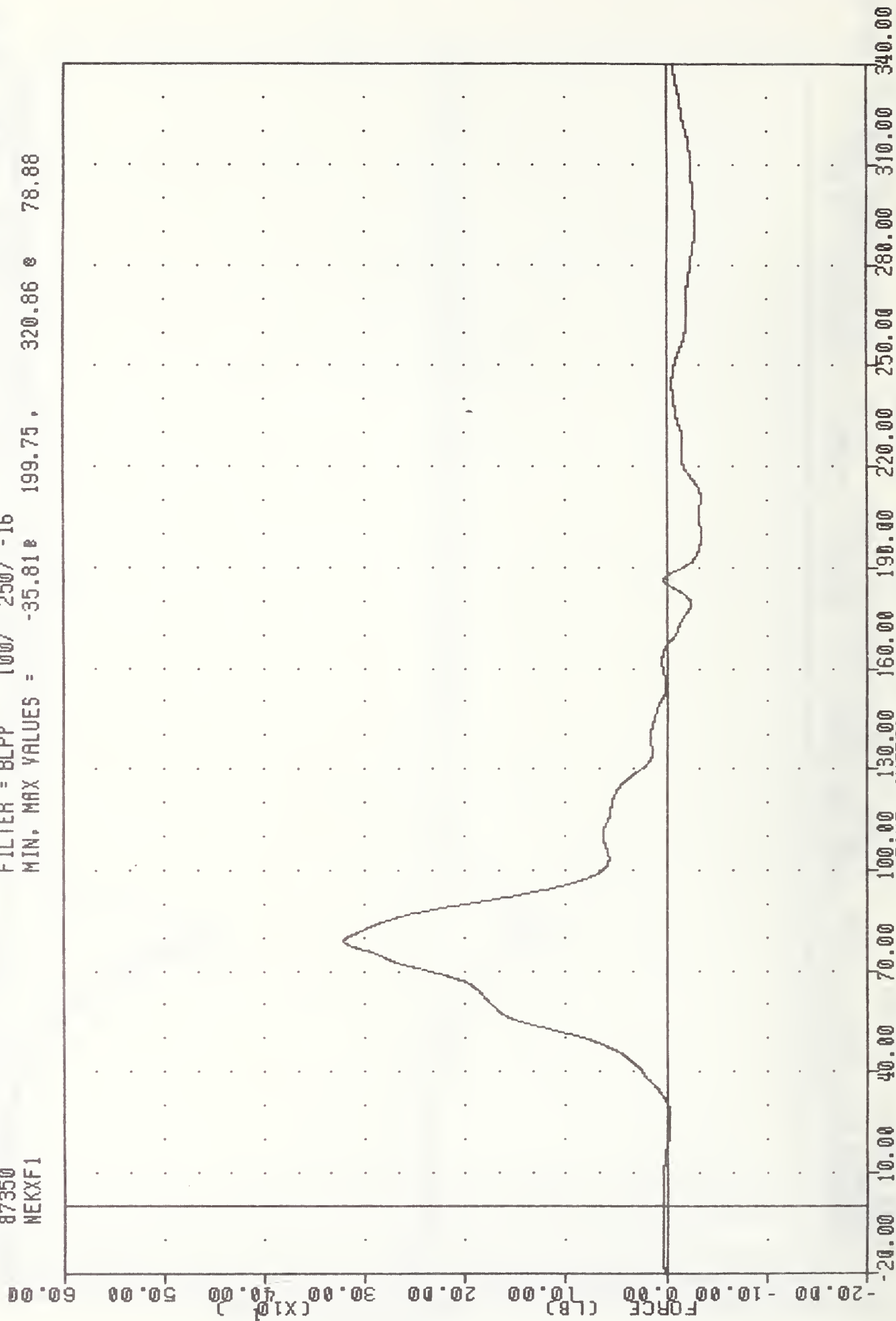
FILTER = ALPF 1650/ 5214/ -40  
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FORD ESCORT INTO FRONTAL BARRIER  
DRIVER HEAD RESULTANT ACCELERATION

TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 NEKXF1

FILTER = BLPP 100/ 250/ -16  
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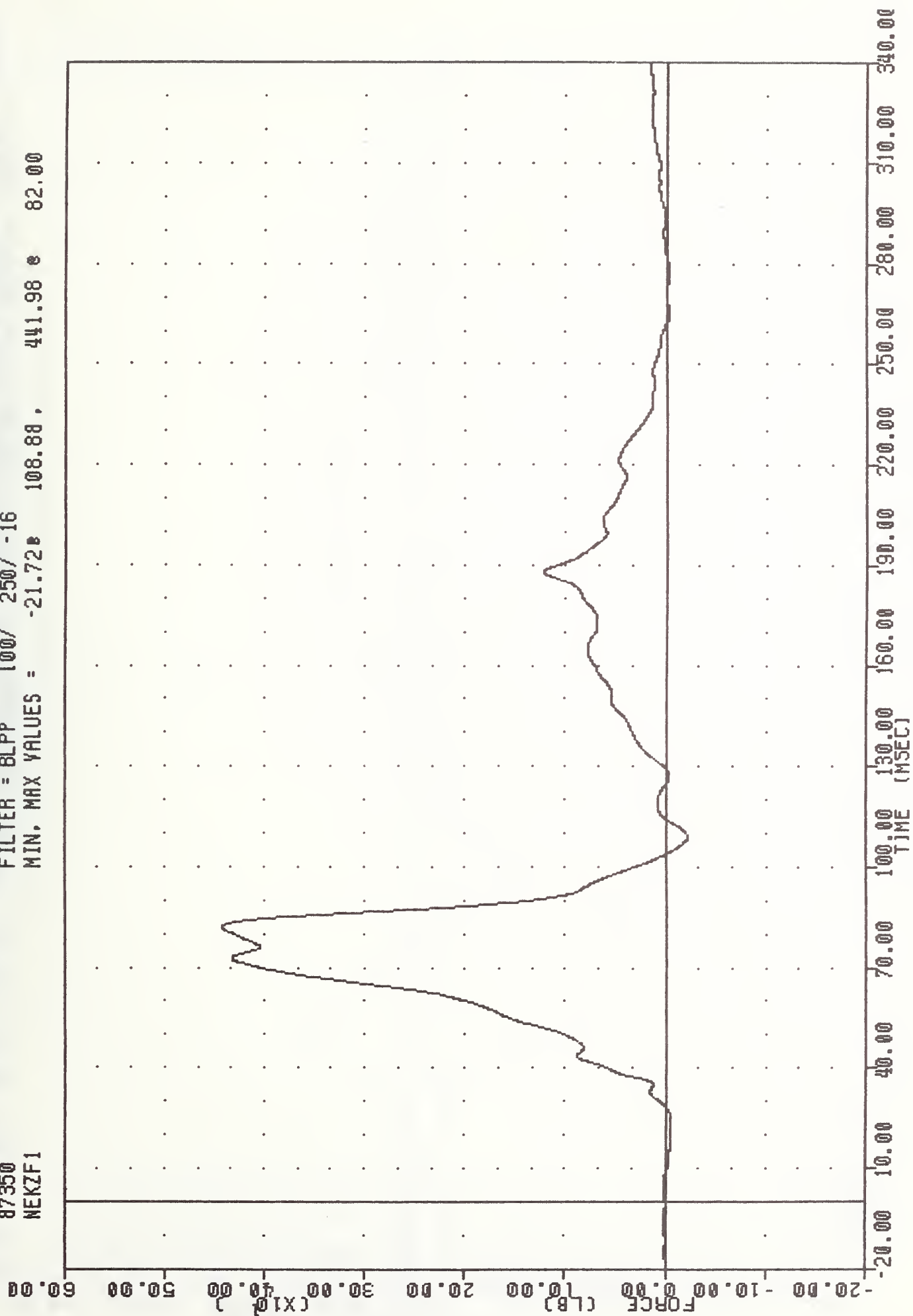


FORD ESCORT INTO FRONTAL BARRIER  
 DRIVER NECK FORCE X AXIS LBS (SHEAR)



TRC .871216  
 200 FRONTAL CRASH TEST  
 87350  
 NEKZF1

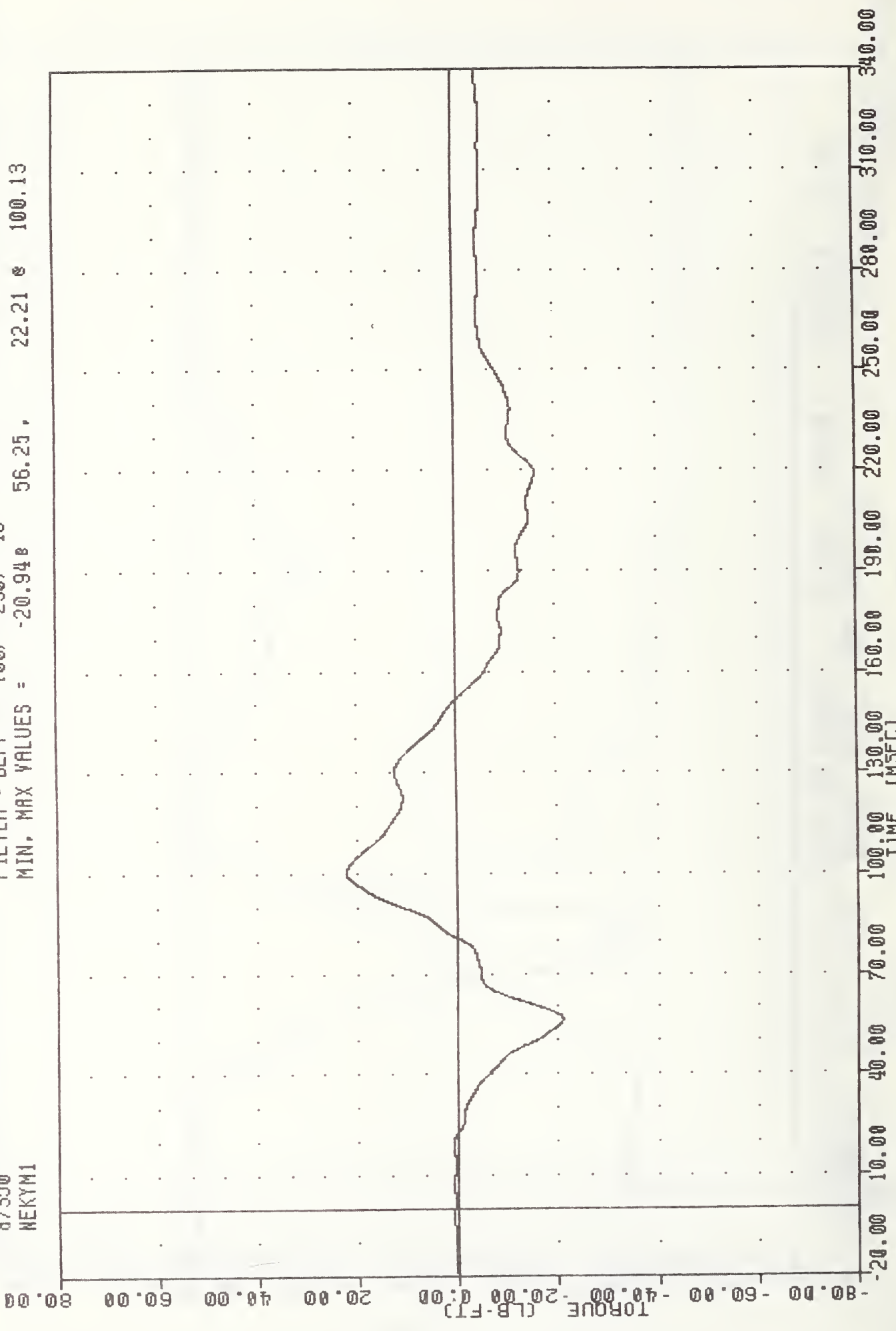
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -21.72 108.88, 441.98 82.00



FORD ESCORT INTO FRONTAL BARRIER  
 DRIVER NECK FORCE Z AXIS LBS (AXIAL)

TBC  
 871216  
 200 FRONTAL CRASH TEST  
 87350  
 NEKYM1

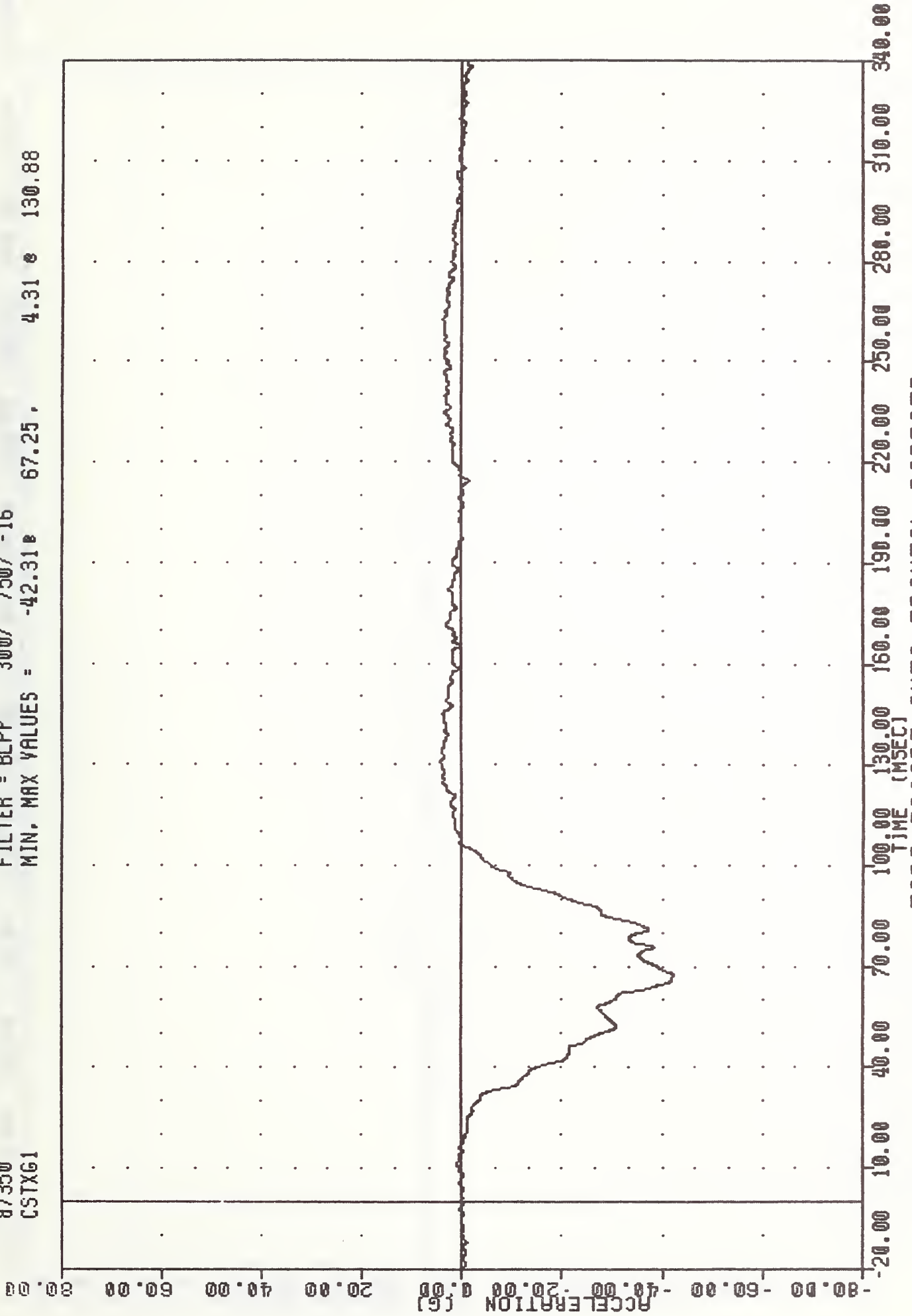
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 MIN, MAX VALUES = -20.948 56.25, 22.21 100.13



FORD ESCORT INTO FRONTAL BARRIER  
 DRIVER NECK MOMENT Y AXIS FT-LBS

TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 CSTXG1

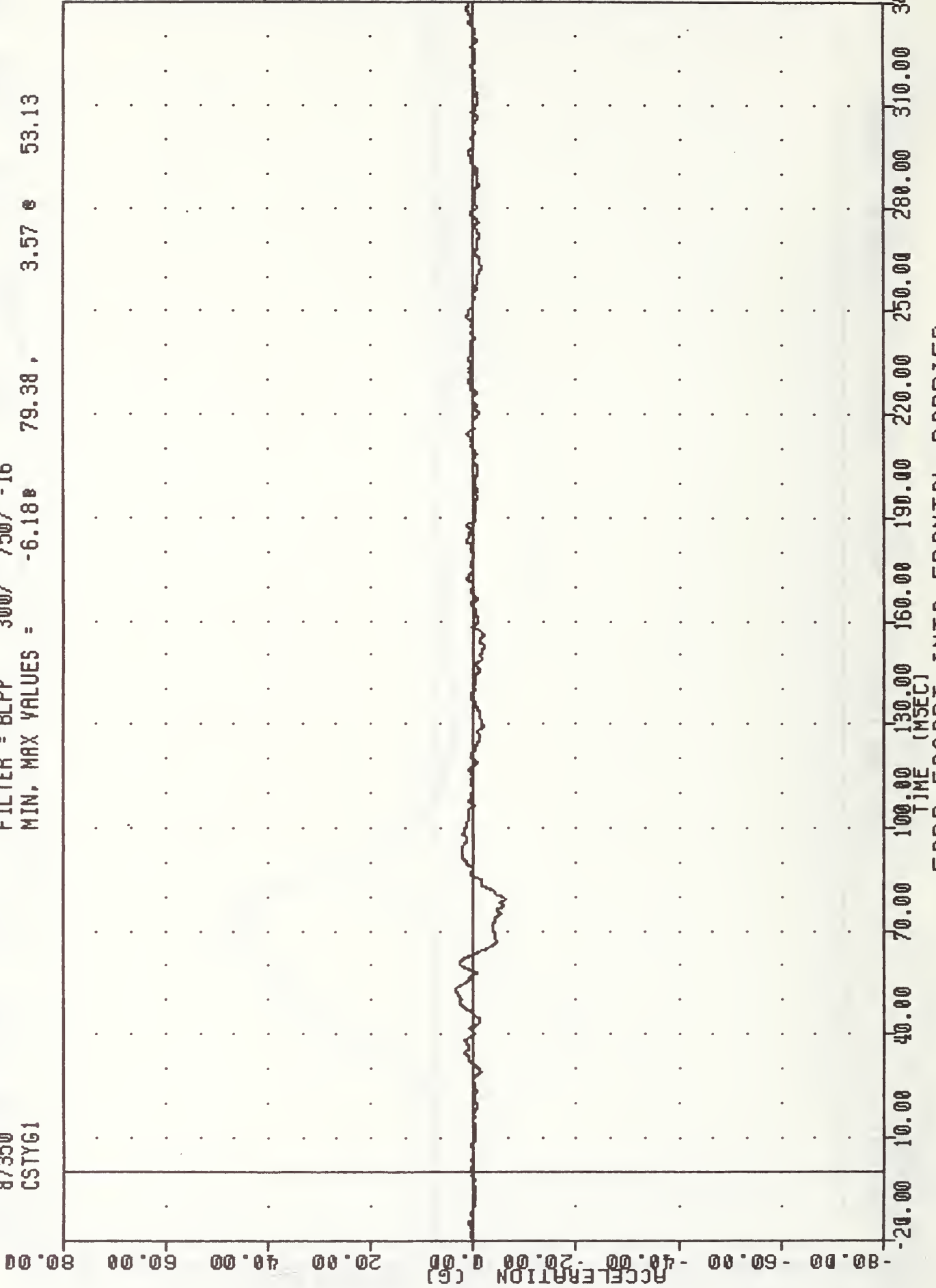
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -42.31e 67.25, 4.31 e 130.88



FORD ESCORT INTO FRONTAL BARRIER  
 DRIVER CHEST X AXIS ACCELERATION

TRC , 871216  
 208 FRONTAL CRASH TEST  
 87350  
 CSTYG1

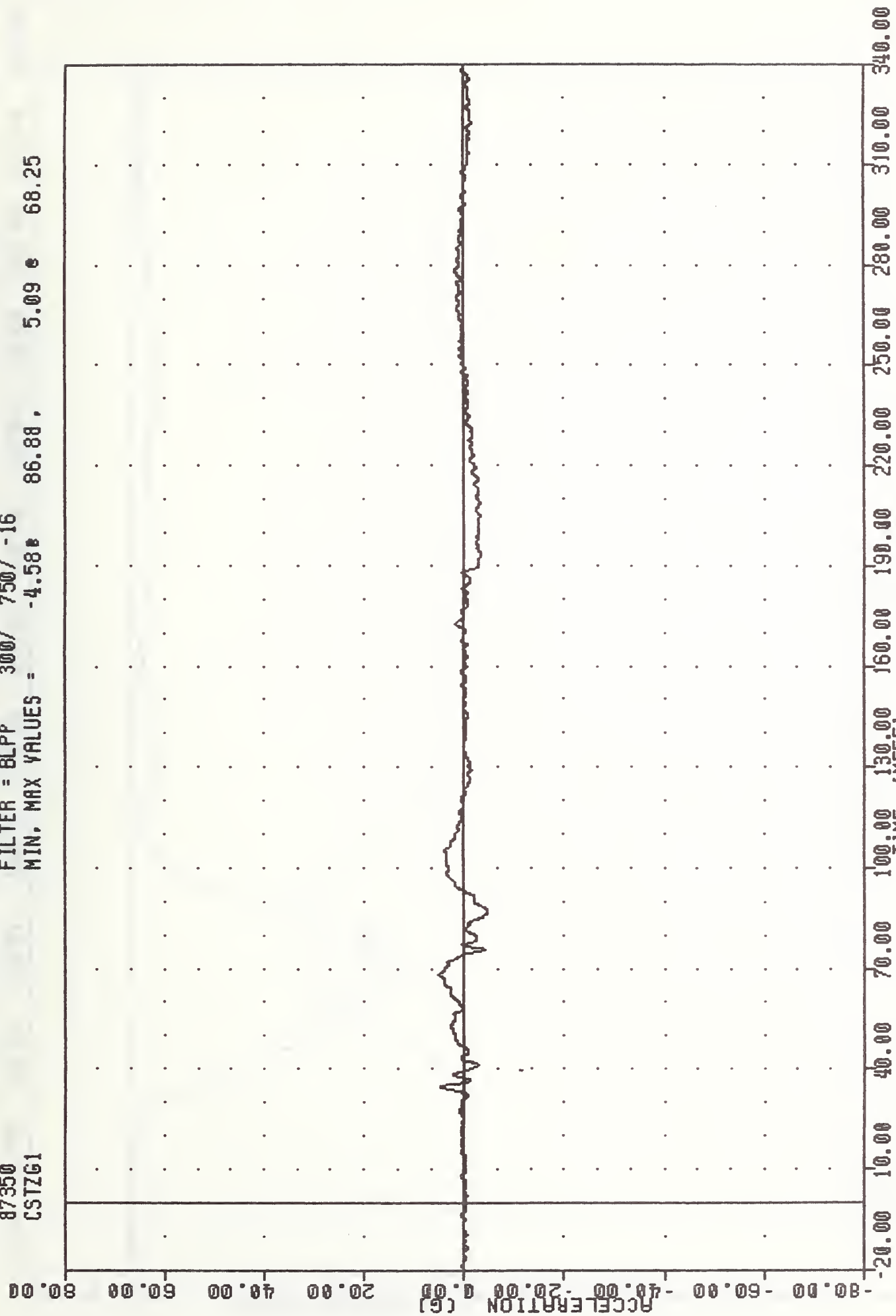
FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -6.18 79.38 , 3.57 53.13





TRC , 871216  
208 FRONTAL CRASH TEST  
87350  
CSTZG1

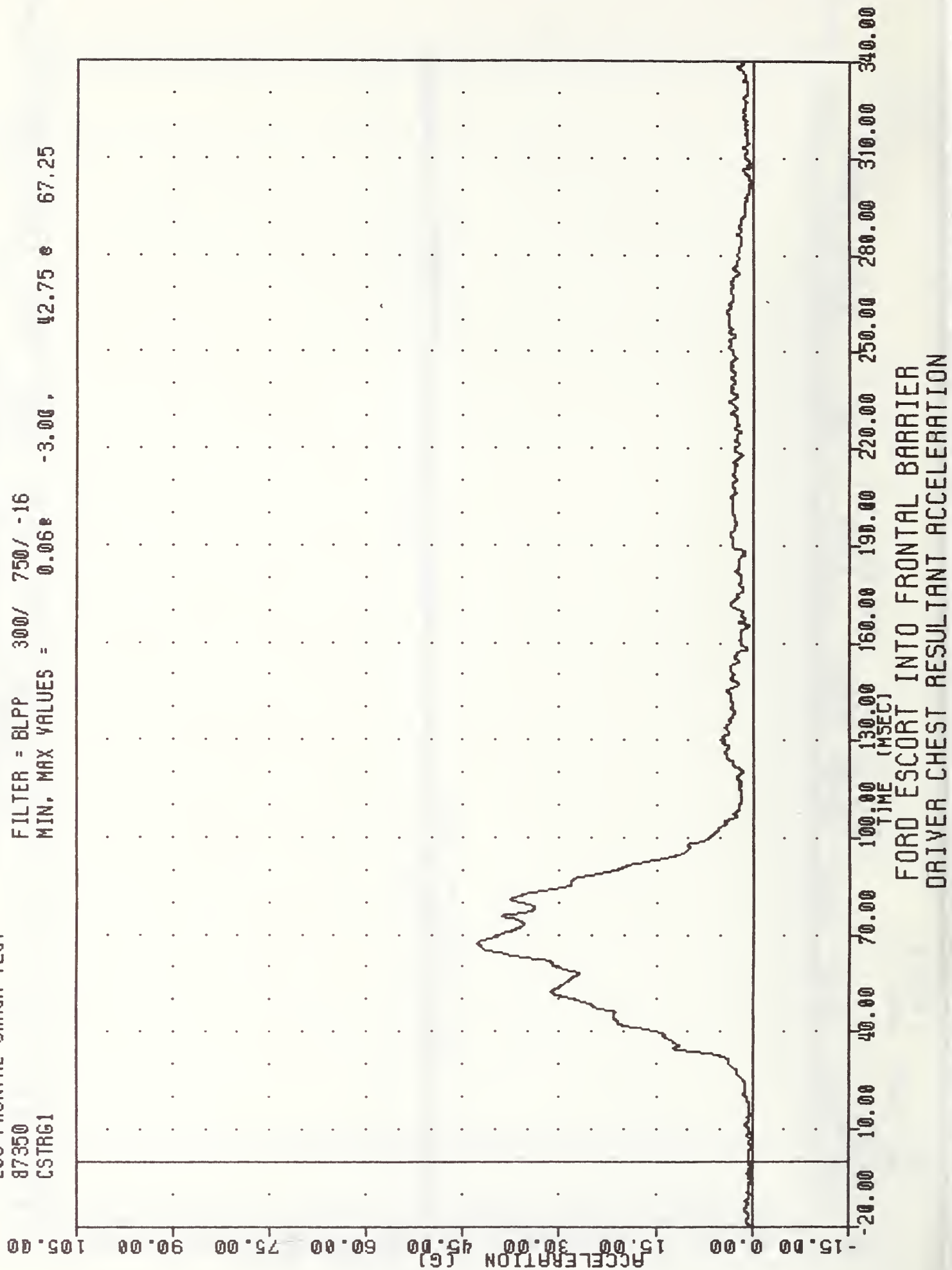
FILTER = BLPP 300/ 750/ -16  
MIN, MAX VALUES = -4.58 86.88, 5.09 68.25



FORD ESCORT INTO FRONTAL BARRIER  
DRIVER CHEST Z AXIS ACCELERATION

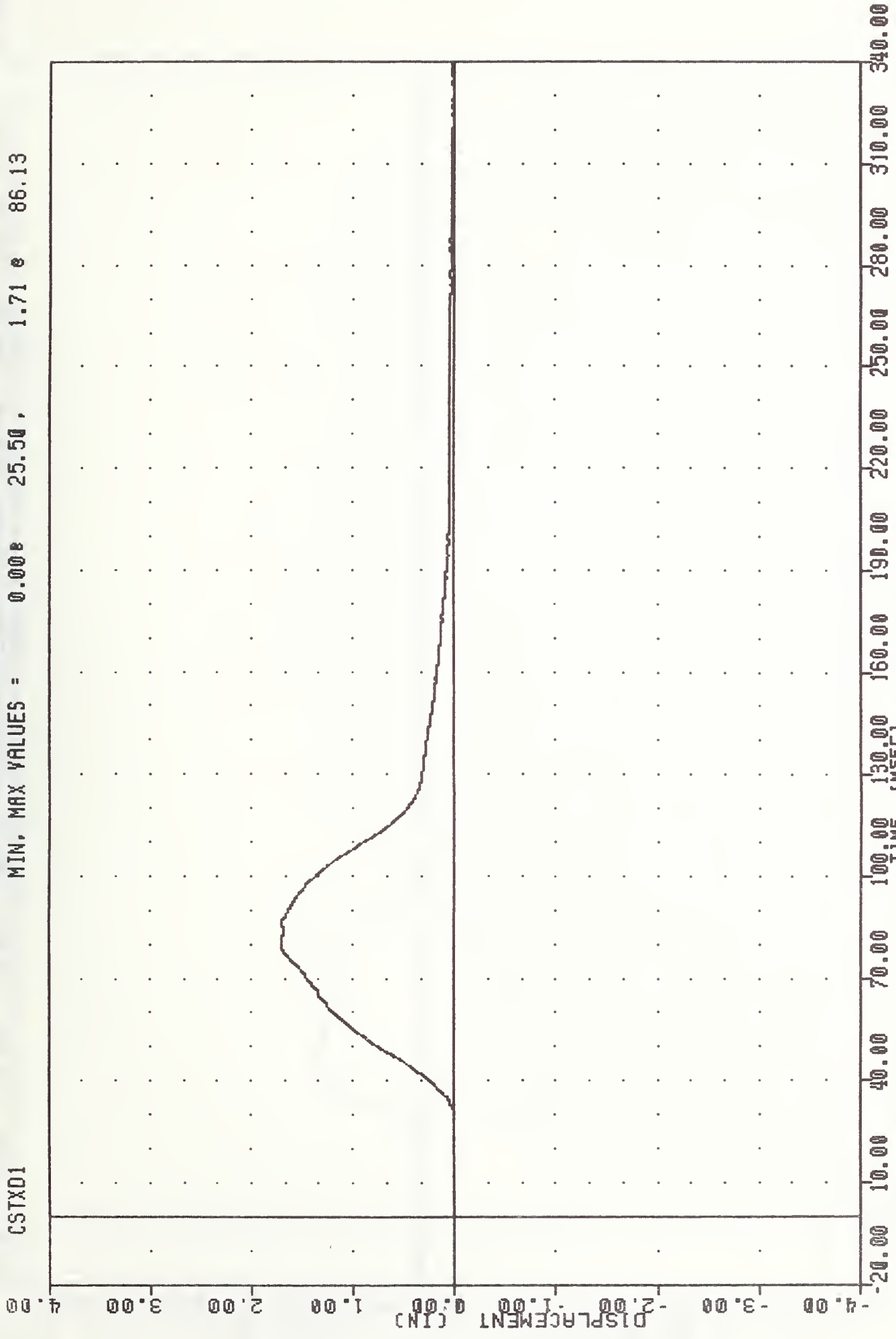
TRC , 871216  
 208 FRONTAL CRASH TEST  
 87350  
 CSTRG1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.06e -3.00e 42.75e 67.25



TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 CSTXD1

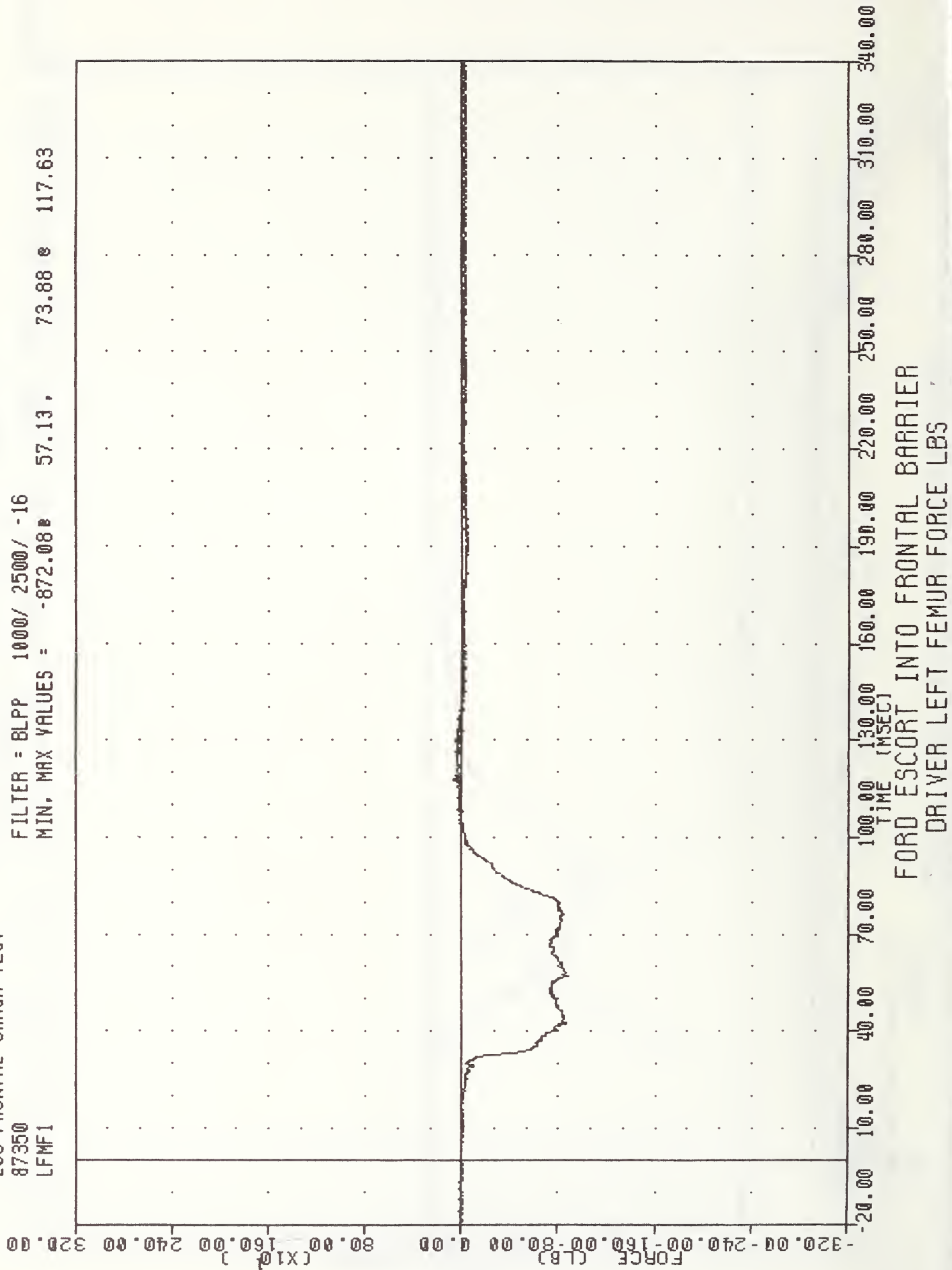
FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = 0.00 25.50, 1.71 86.13



FORD ESCORT INTO FRONTAL BARRIER  
 DRIVER CHEST DISPLACEMENT INCHES

TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 LFMF1

FILTER = BLPP 1000/ 2500/ -16  
 MIN, MAX VALUES = -872.08 57.13, 73.88 117.63

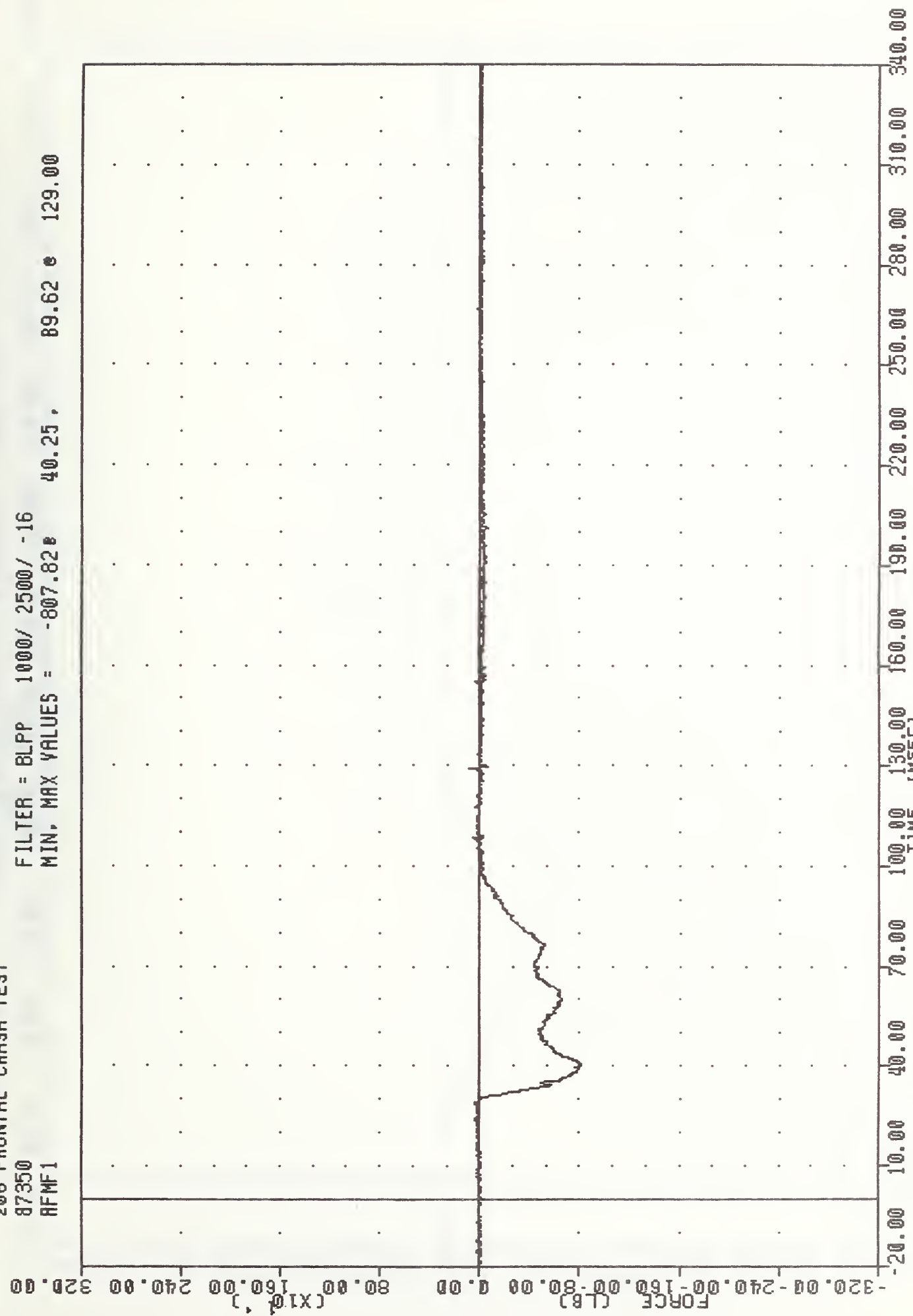


FORD ESCORT INTO FRONTAL BARRIER  
 DRIVER LEFT FEMUR FORCE LBS



TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 AFMF1

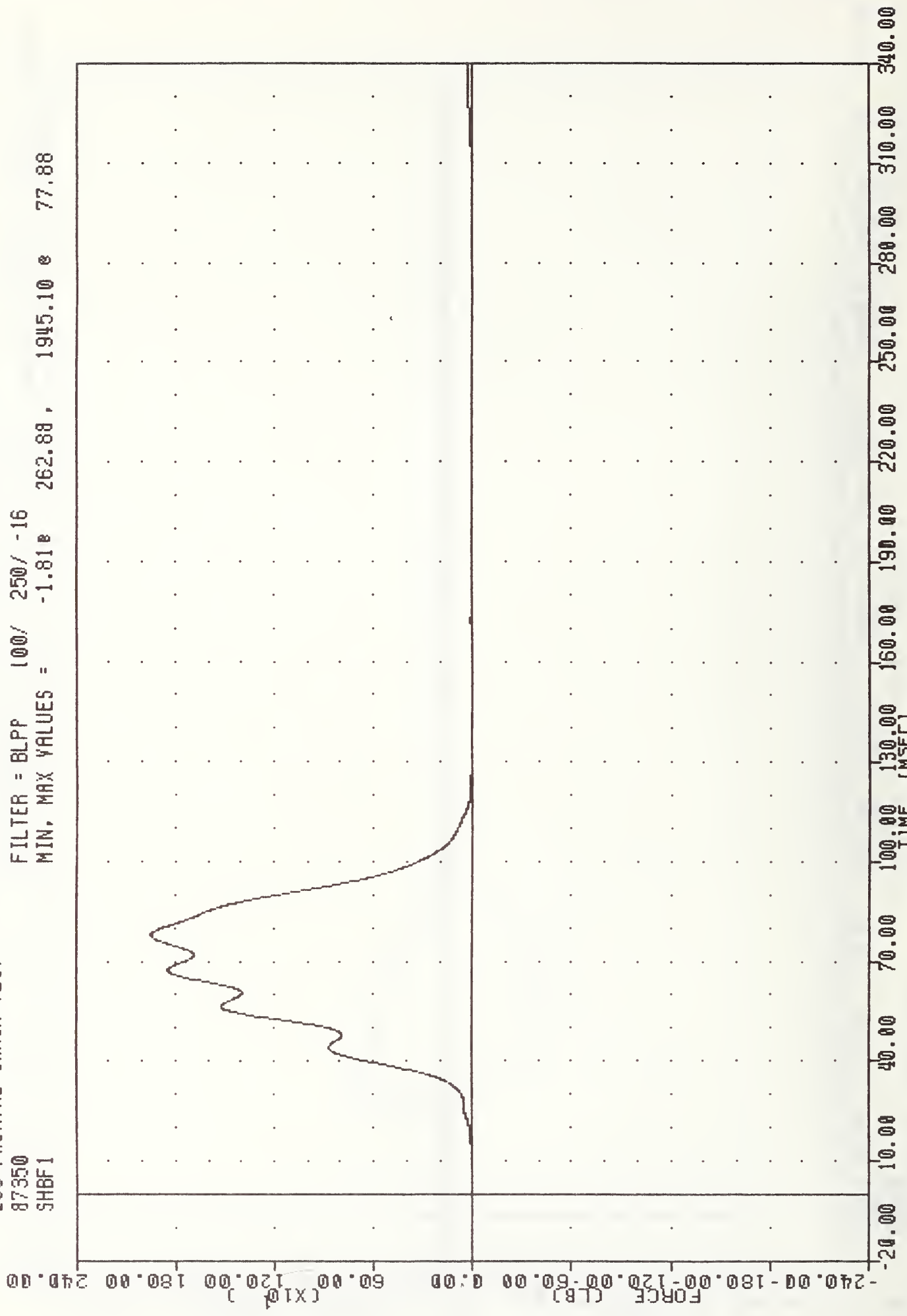
FILTER = BLPP 1000/ 2500/ -16  
 MIN, MAX VALUES = -807.82 40.25, 89.62 129.00



FORD ESCORT INTO FRONTAL BARRIER  
 DRIVER RIGHT FEMUR FORCE LBS

TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 SHBF1

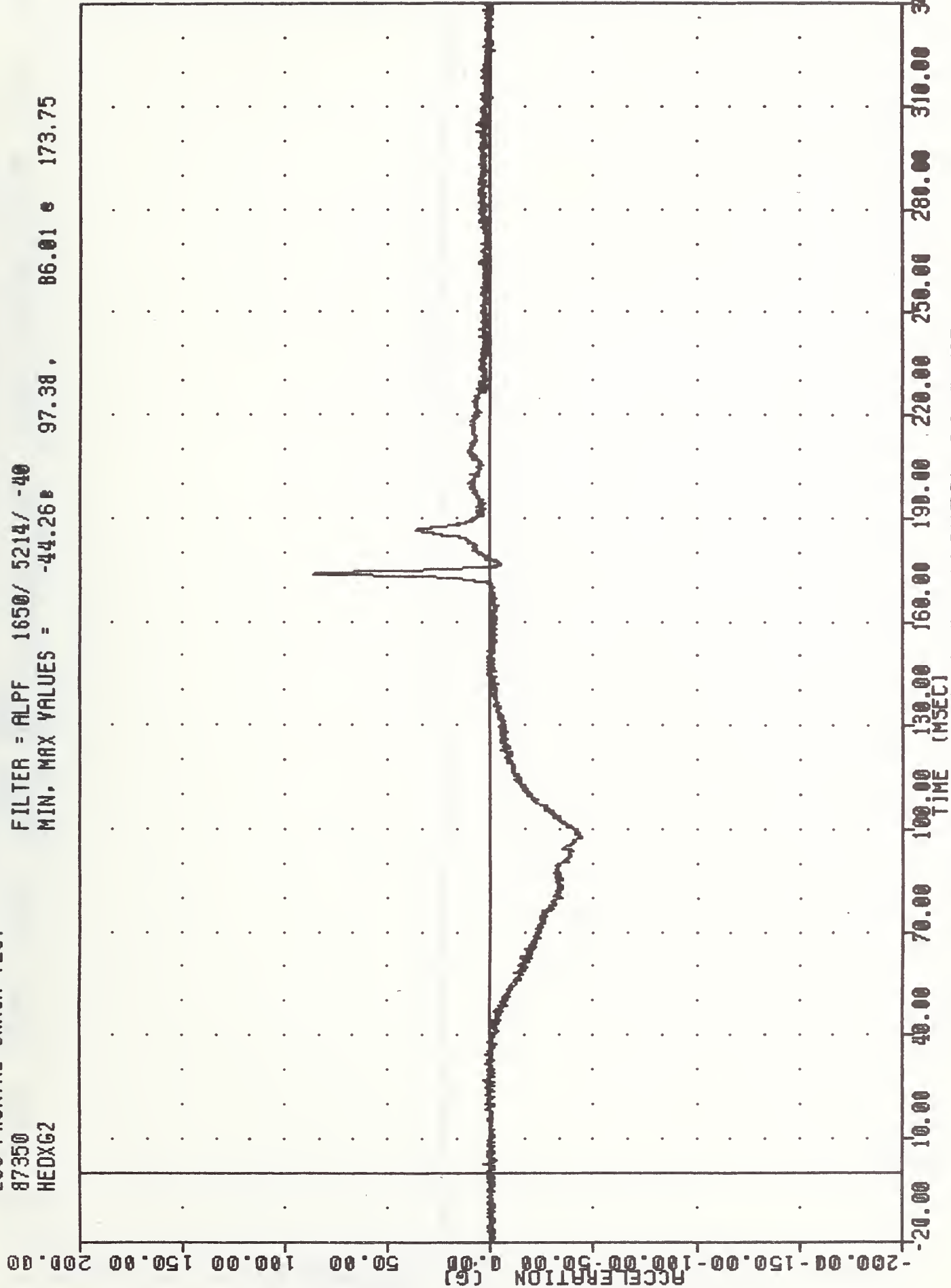
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -1.81e 262.88, 1945.10 e 77.88



FORD ESCORT INTO FRONTAL BARRIER  
 DRIVER'S PASSIVE BELT INBOARD FORCE LBS

TRC , 871216  
 208 FRONTAL CRASH TEST  
 87350  
 HEDXG2

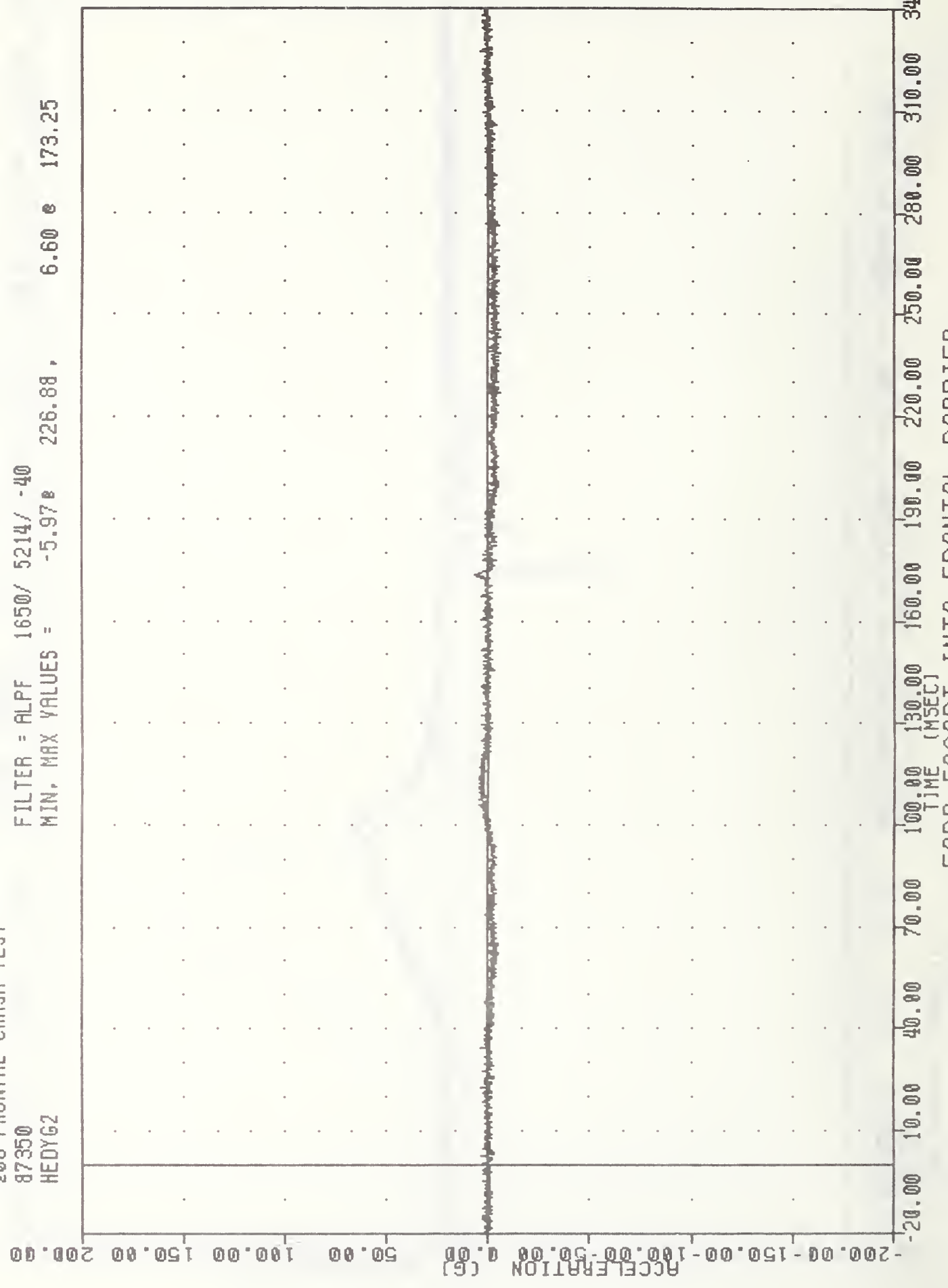
FILTER = ALPF 1650/ 5214/ -40  
 MIN. MAX VALUES = -44.26 97.38 , 86.01 173.75



FORD ESCORT INTO FRONTAL BARRIER  
 PASSENGER HEAD X AXIS ACCELERATION

TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 HEDYG2

FILTER = ALPF 1650/ 5214/ -40  
 MIN. MAX VALUES = -5.97 226.88 , 6.60 173.25

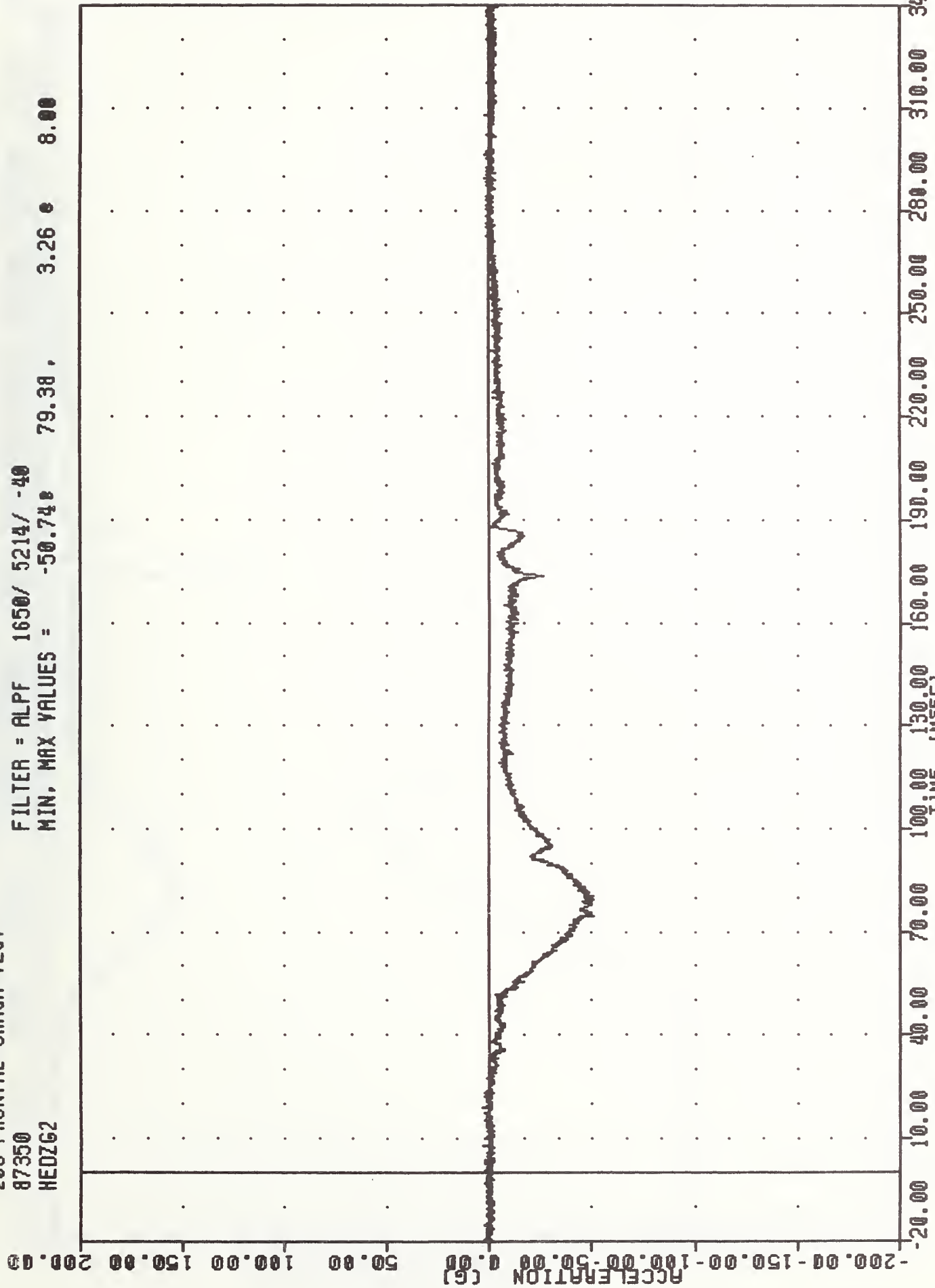


FORD ESCORT INTO FRONTAL BARRIER  
 PASSENGER HEAD Y AXIS ACCELERATION



TRC , 871216  
200 FRONTAL CRASH TEST  
87350  
HEDZG2

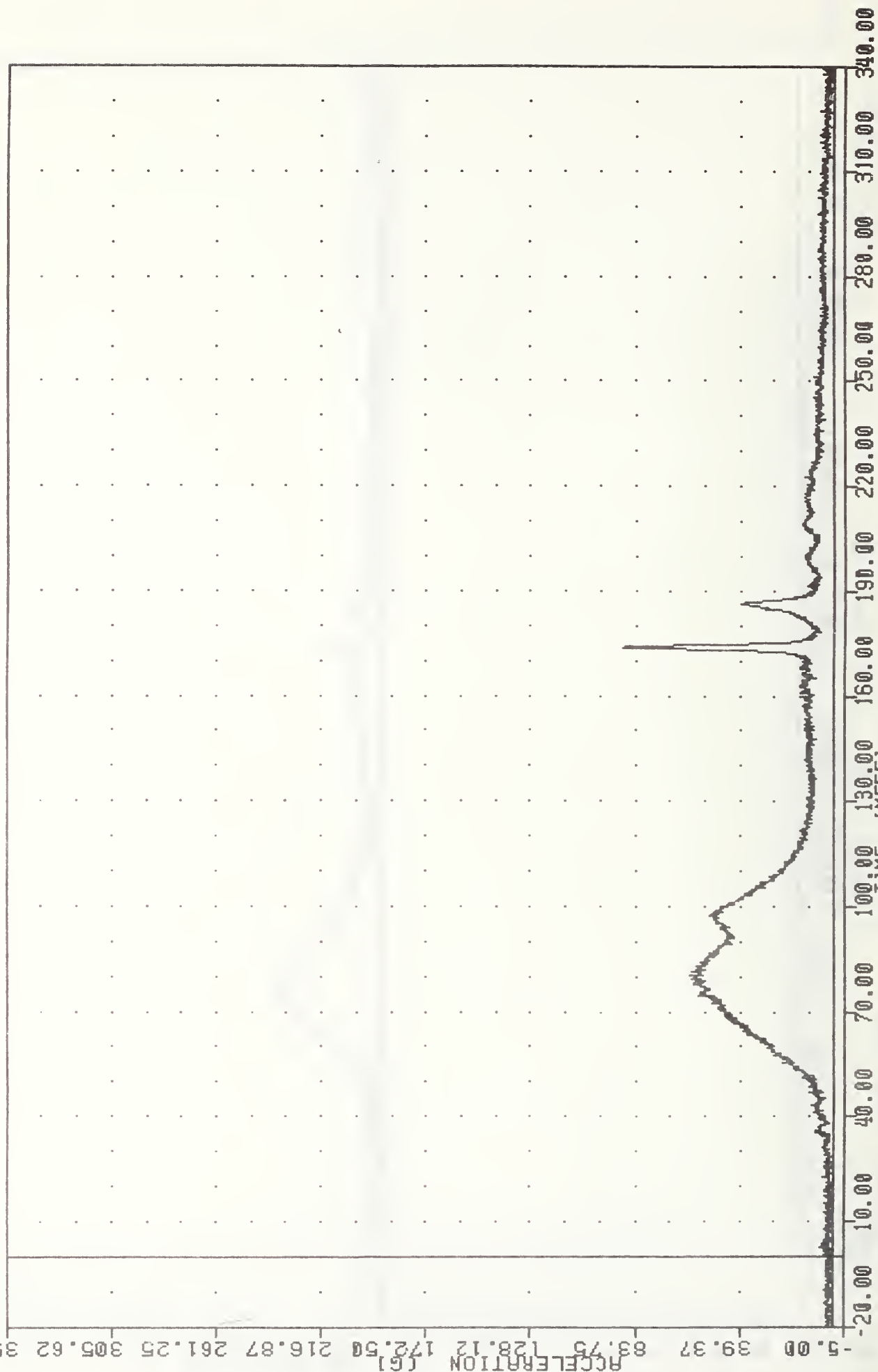
FILTER = ALPF 1650/ 5214/ -40  
MIN, MAX VALUES = -50.74 79.38 , 3.26 8.00



FORD ESCORT INTO FRONTAL BARRIER  
PASSENGER HEAD Z AXIS ACCELERATION

TRC , 871216  
208 FRONTAL CRASH TEST  
87350  
HEDRG2

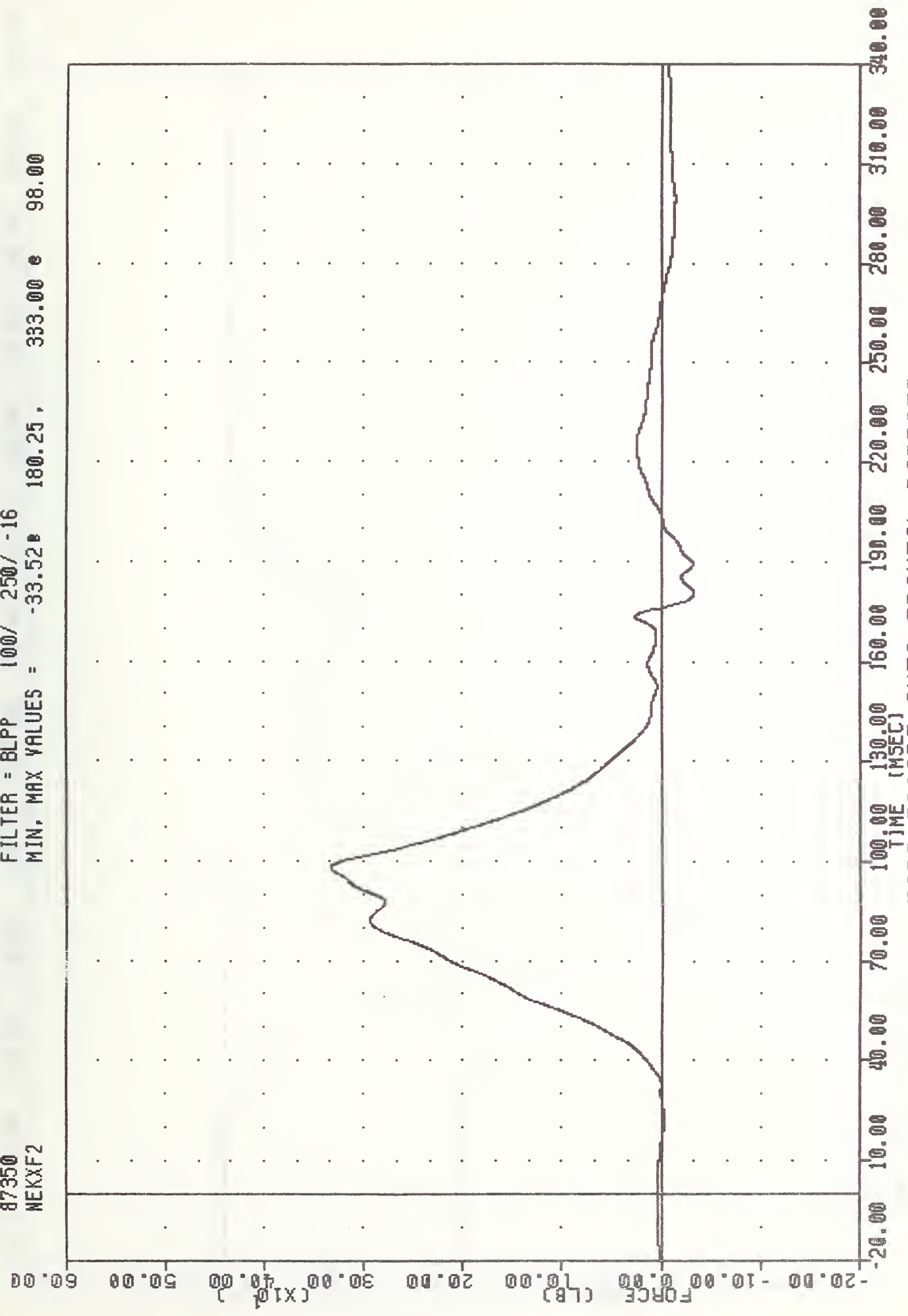
FILTER = ALPF 1650/ 5214/ -40  
MIN, MAX VALUES = 0.30g 11.38, 89.26 g 173.75



FORD ESCORT INTO FRONTAL BARRIER  
PASSENGER HEAD RESULTANT ACCELERATION

TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 NEKXF2

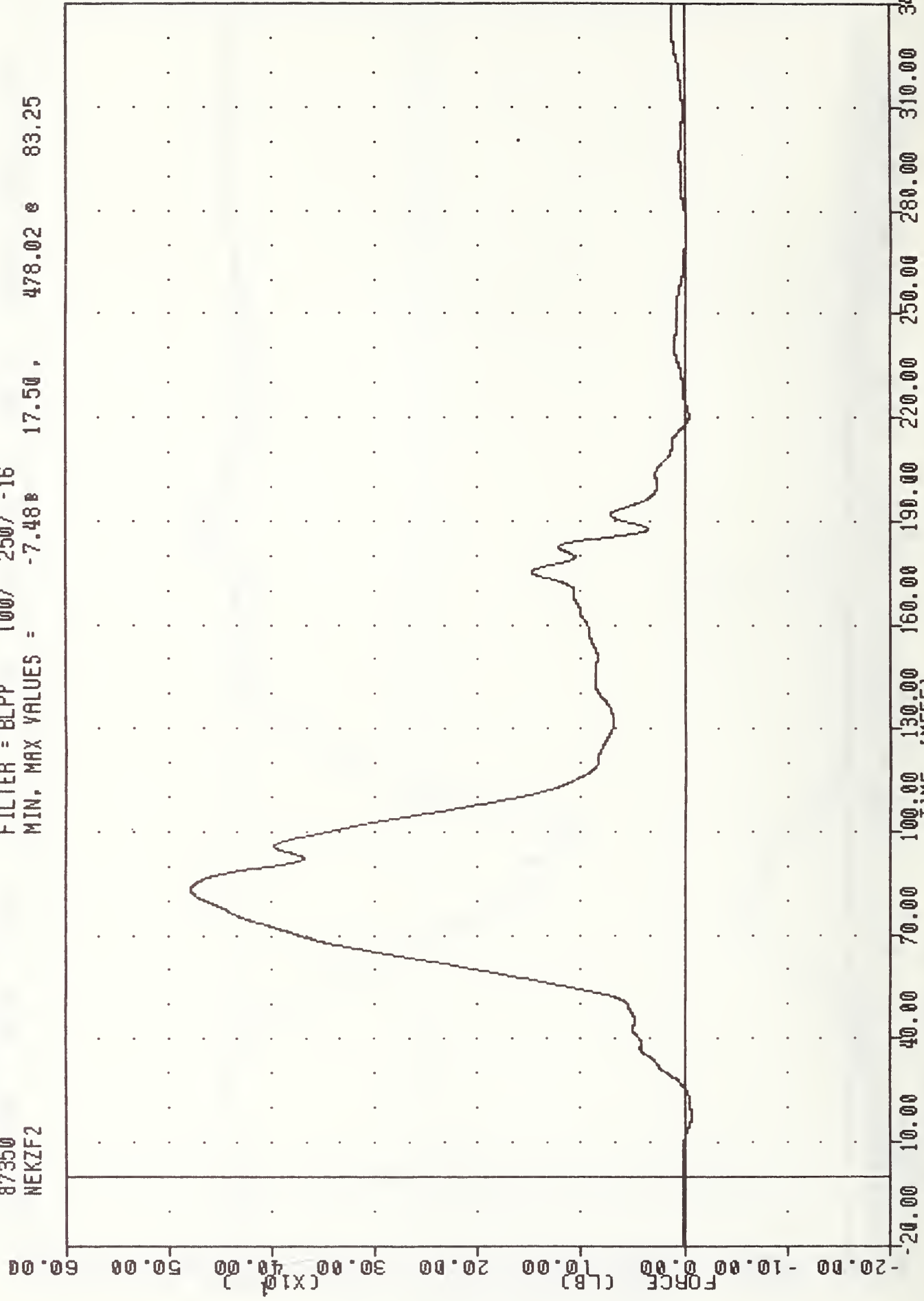
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -33.52 180.25, 333.00 98.00



FORD ESCORT INTO FRONTAL BARRIER  
 PASSENGER NECK FORCE X AXIS LBS (SHEAR)

TRC , 871216  
208 FRONTAL CRASH TEST  
87350  
NEKZF2

FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -7.48 17.50 , 478.02 83.25

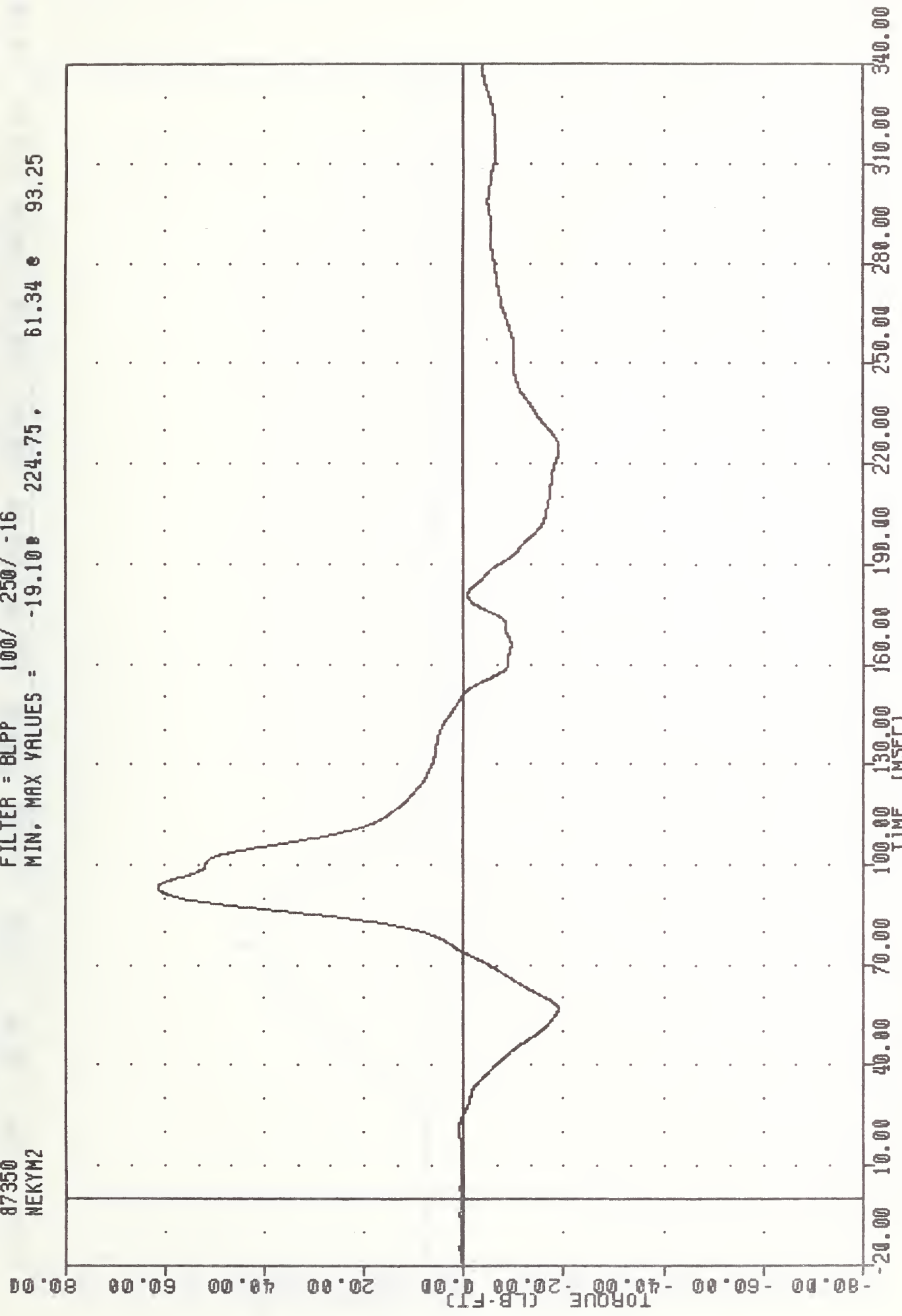


FORD ESCORT INTO FRONTAL BARRIER  
PASSENGER NECK FORCE Z AXIS LBS (AXIAL)



TRC , 871216  
208 FRONTAL CRASH TEST  
87350  
NEKYM2

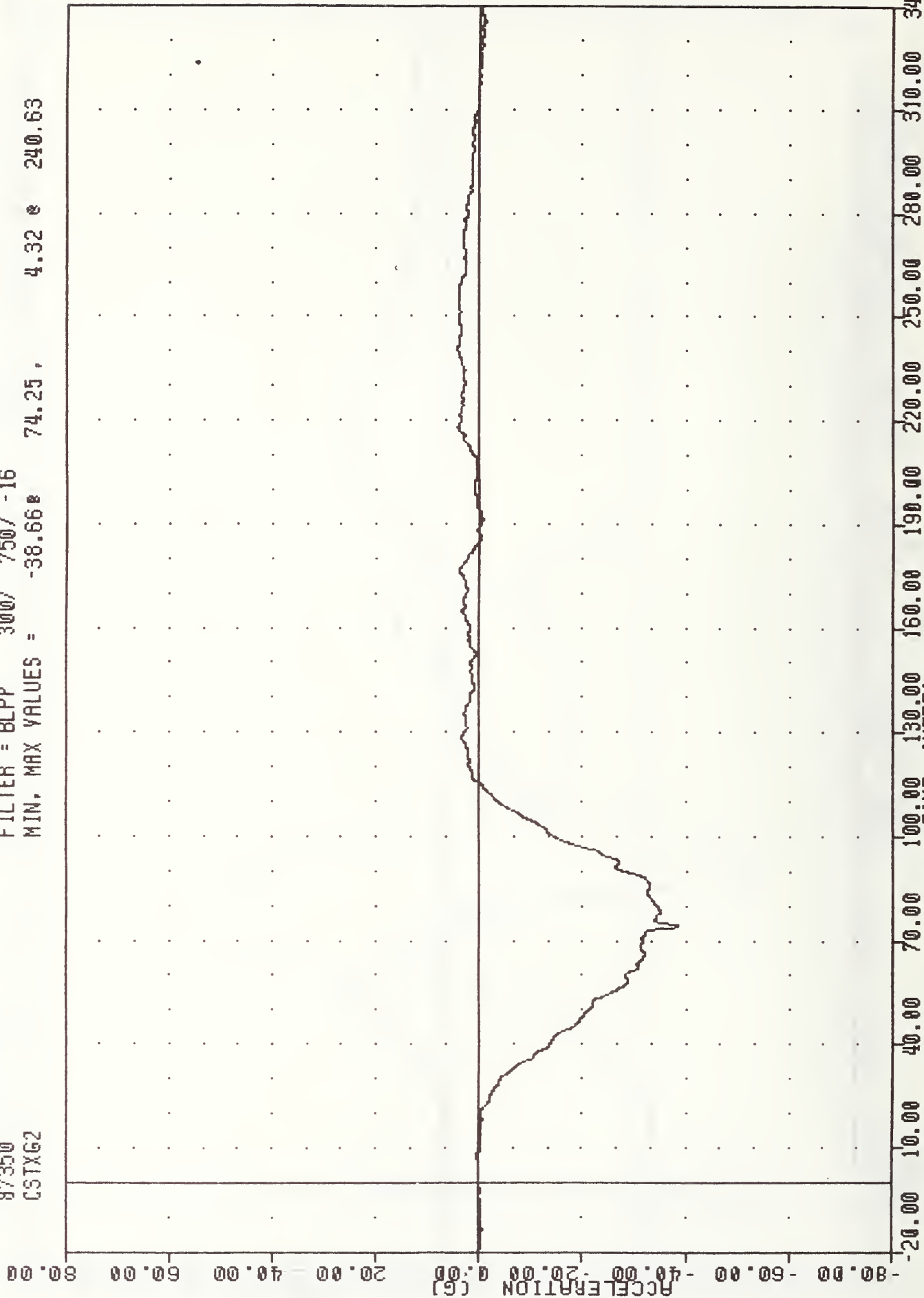
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -19.10 224.75 , 61.34 93.25



FORD ESCORT INTO FRONTAL BARRIER  
PASSENGER NECK MOMENT Y AXIS FT-LBS

TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 CSTXG2

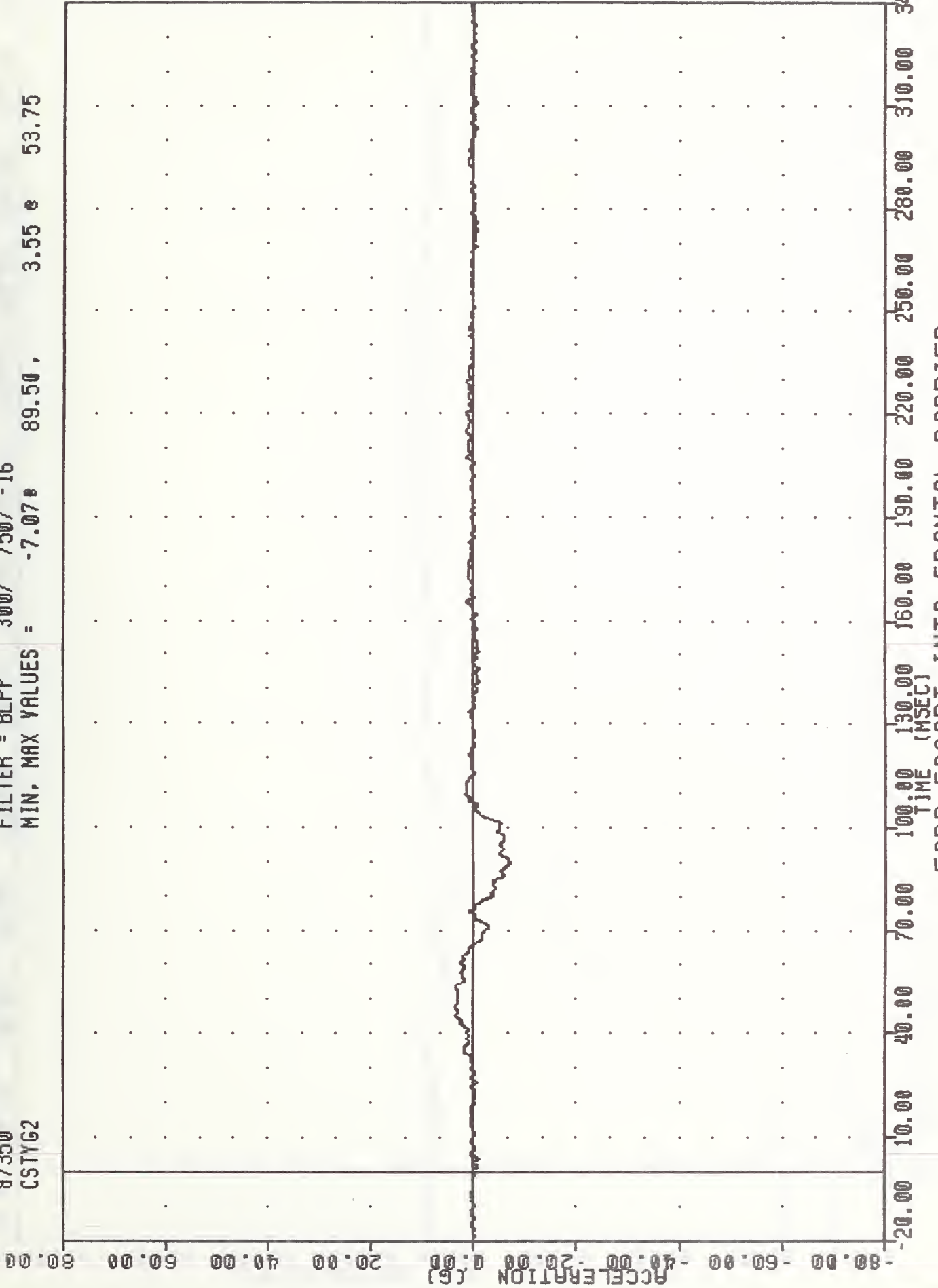
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -38.66 74.25 , 4.32 240.63



FORD ESCORT INTO FRONTAL BARRIER  
 PASSENGER CHEST X AXIS ACCELERATION

TRC , 871216  
208 FRONTAL CRASH TEST  
87350  
CSTYG2

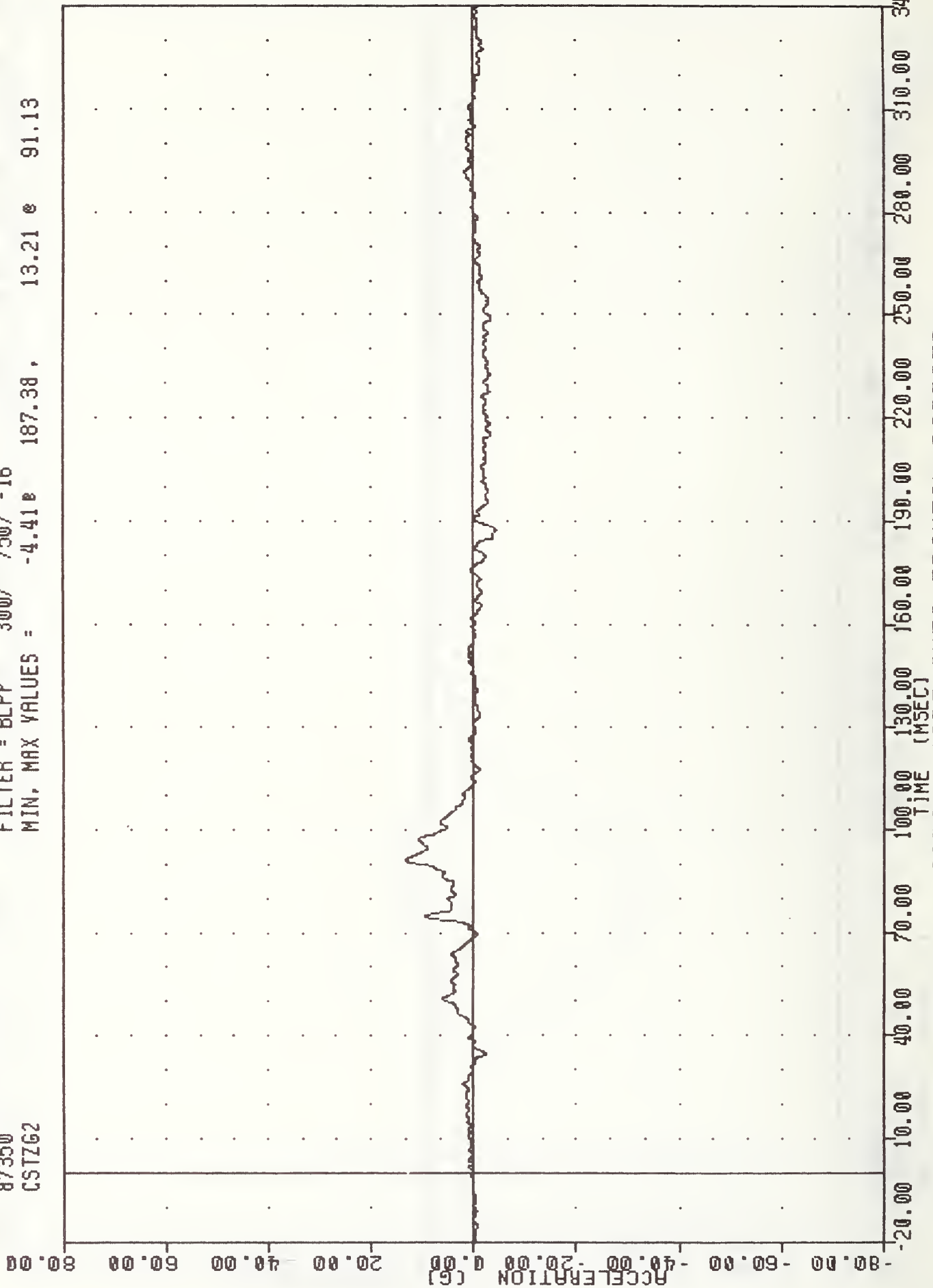
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -7.07e 89.50, 3.55 e 53.75



FORD ESCORT INTO FRONTAL BARRIER  
PASSENGER CHEST Y AXIS ACCELERATION

TRC , 871216  
 208 FRONTAL CRASH TEST  
 87350  
 CSTZG2

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -4.41E 187.38 , 13.21 E 91.13

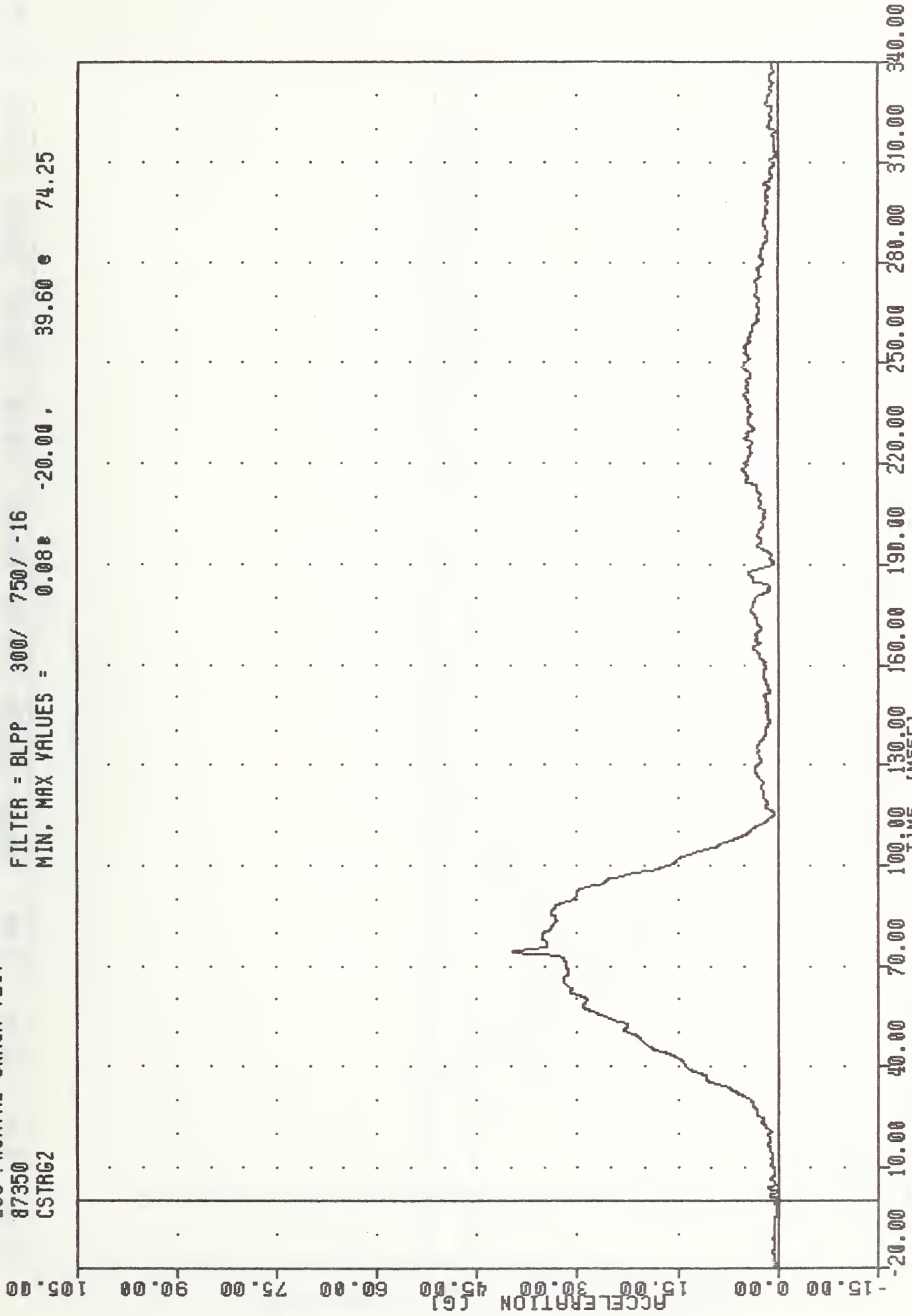


FORD ESCORT INTO FRONTAL BARRIER  
 PASSENGER CHEST Z AXIS ACCELERATION



TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 CSTRG2

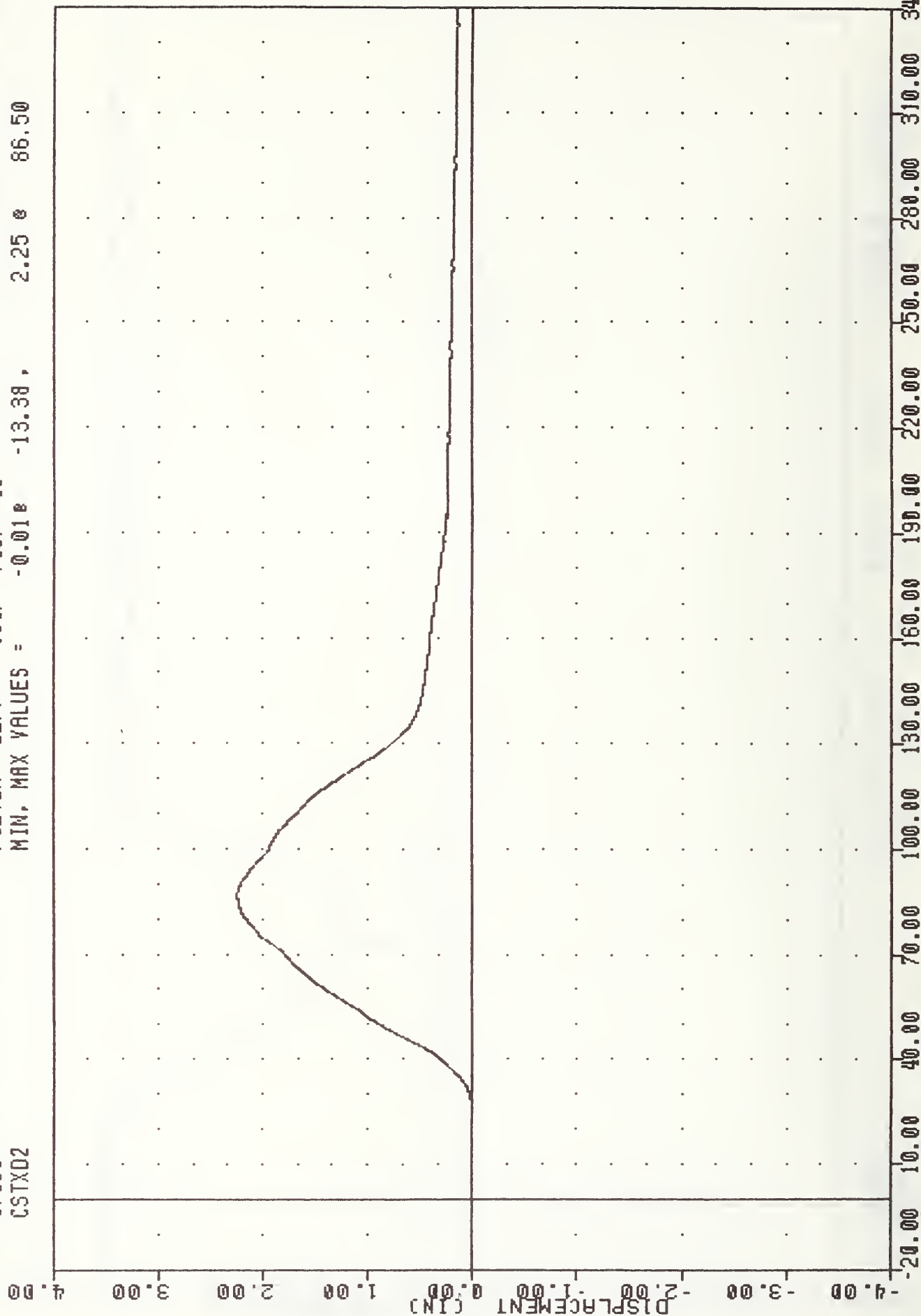
FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = 0.08 -20.00 , 39.60 74.25



FORD ESCORT INTO FRONTAL BARRIER  
 PASSENGER CHEST RESULTANT ACCELERATION

TRC , 871216  
 208 FRONTAL CRASH TEST  
 87350  
 CSTXD2

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -0.018 -13.38 , 2.25 @ 86.50

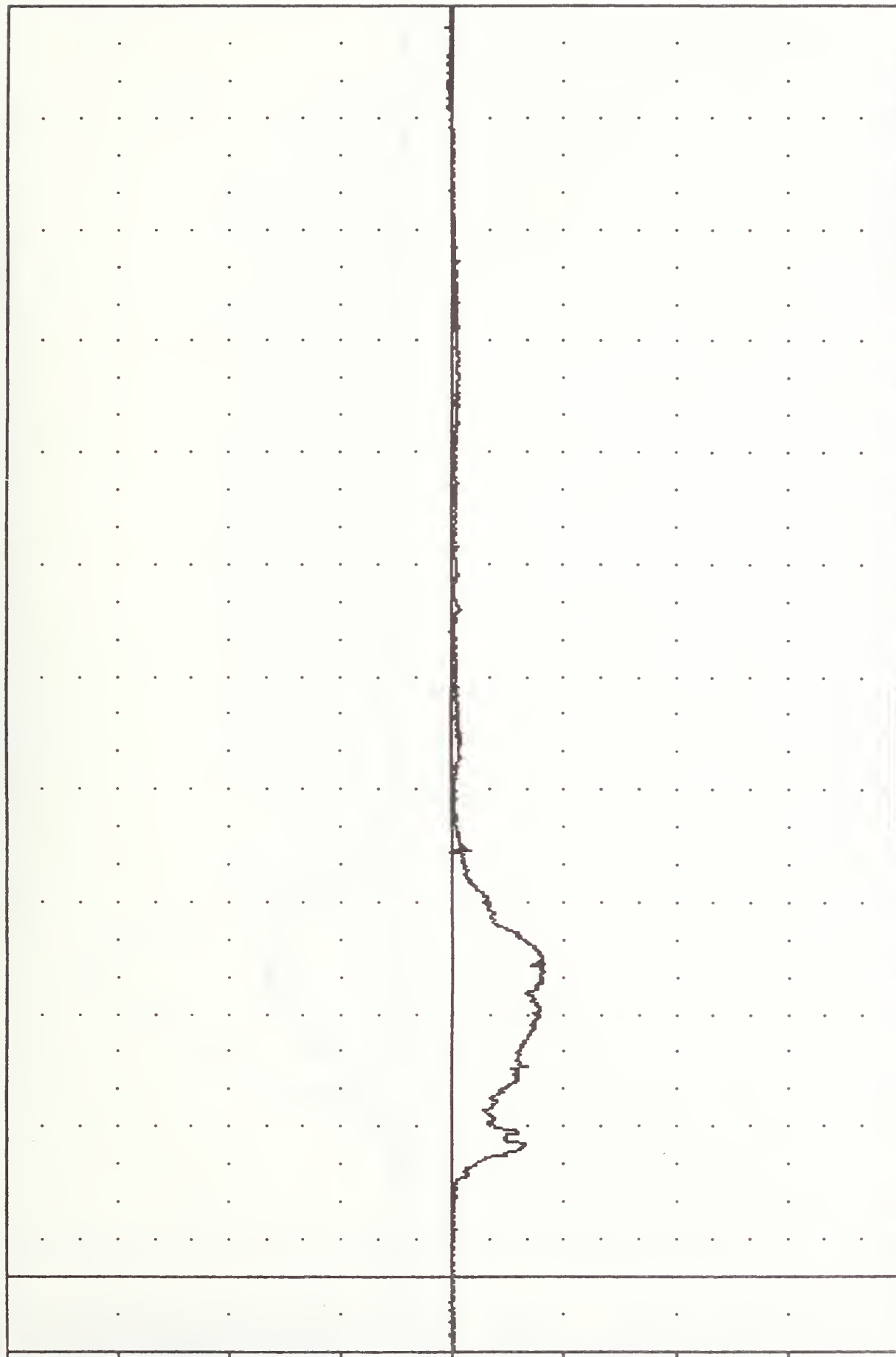


FORD ESCORT INTO FRONTAL BARRIER  
 PASSENGER CHEST DISPLACEMENT INCHES

TRC , 871216  
 208 FRONTAL CRASH TEST  
 87350  
 LFMF2

FILTER = BLPP 1000/ 2500/ -16  
 MIN, MAX VALUES = -654.53e 83.75, 47.52 e 334.50

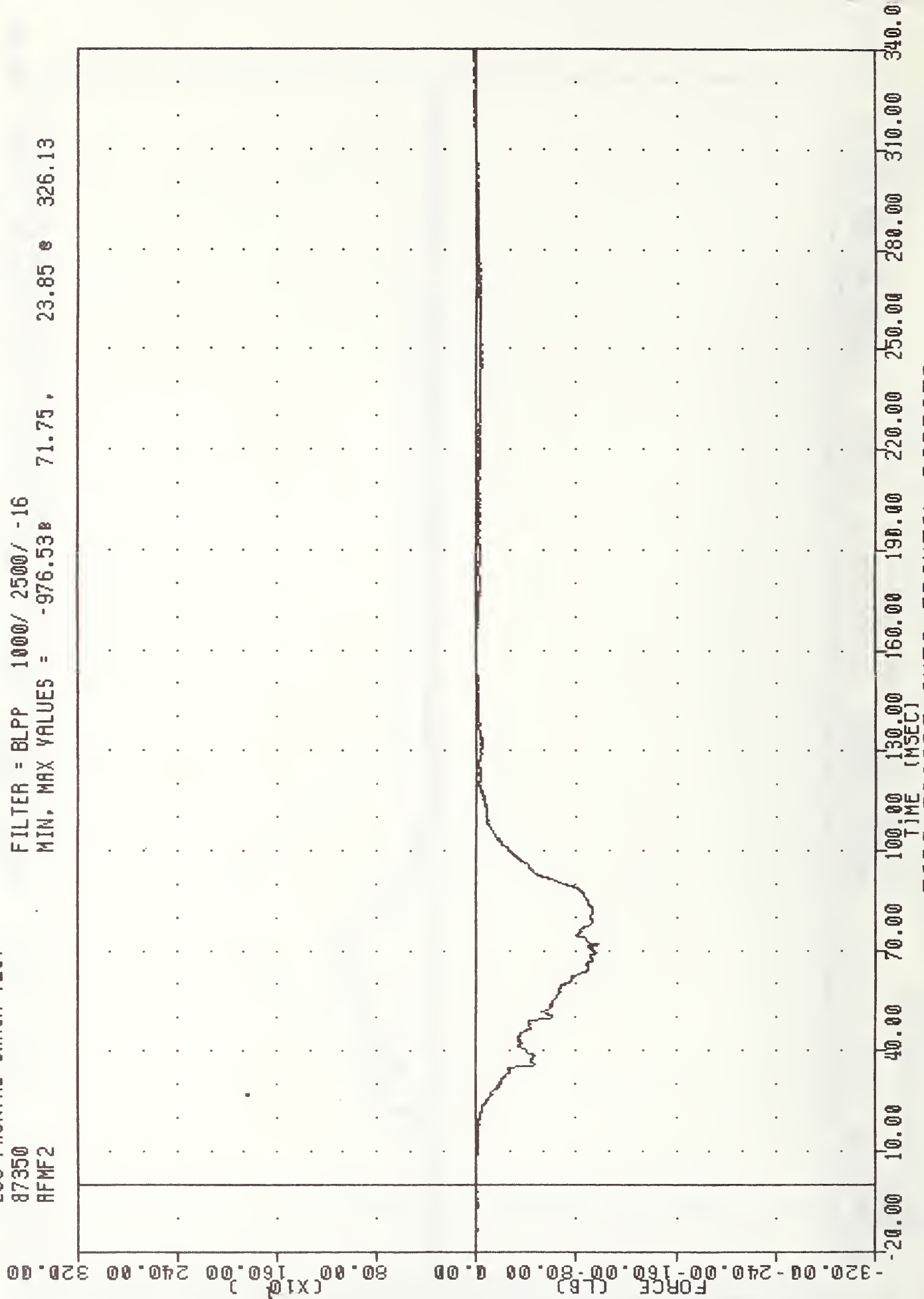
FORCE (LB)  
 (X10<sup>3</sup>)



FORD ESCORT INTO FRONTAL BARRIER  
 PASSENGER LEFT FEMUR FORCE LBS

TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 AFMF2

FILTER = BLPP 1000/ 2500/ -16  
 MIN, MAX VALUES = -976.53 71.75, 23.85 326.13



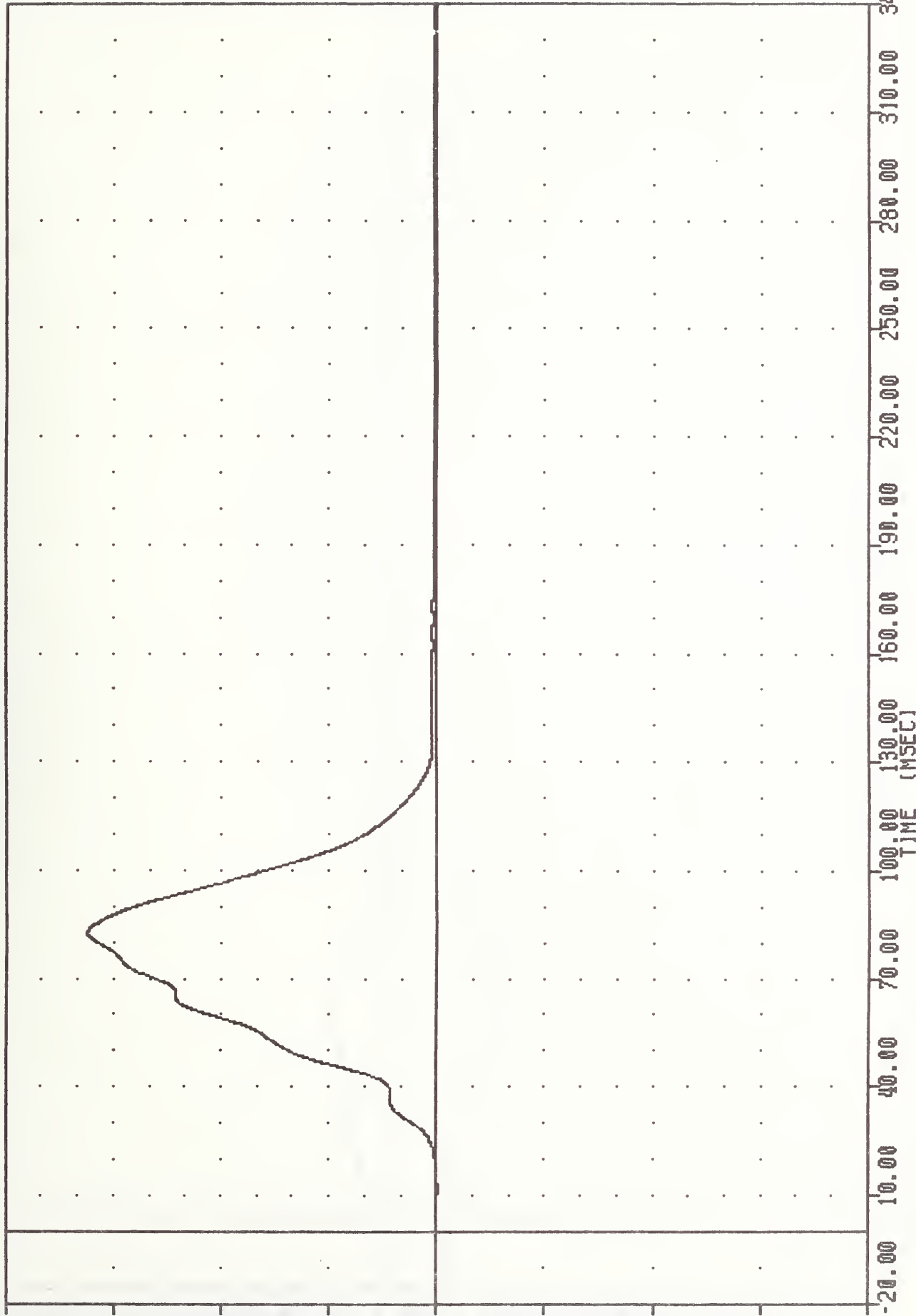
FORD ESCORT INTO FRONTAL BARRIER  
 PASSENGER RIGHT FEMUR FORCE LBS



TRC , 871216  
208 FRONTAL CRASH TEST  
87350  
SHBF2

FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -4.24 11.63, 1946.20 e 82.63

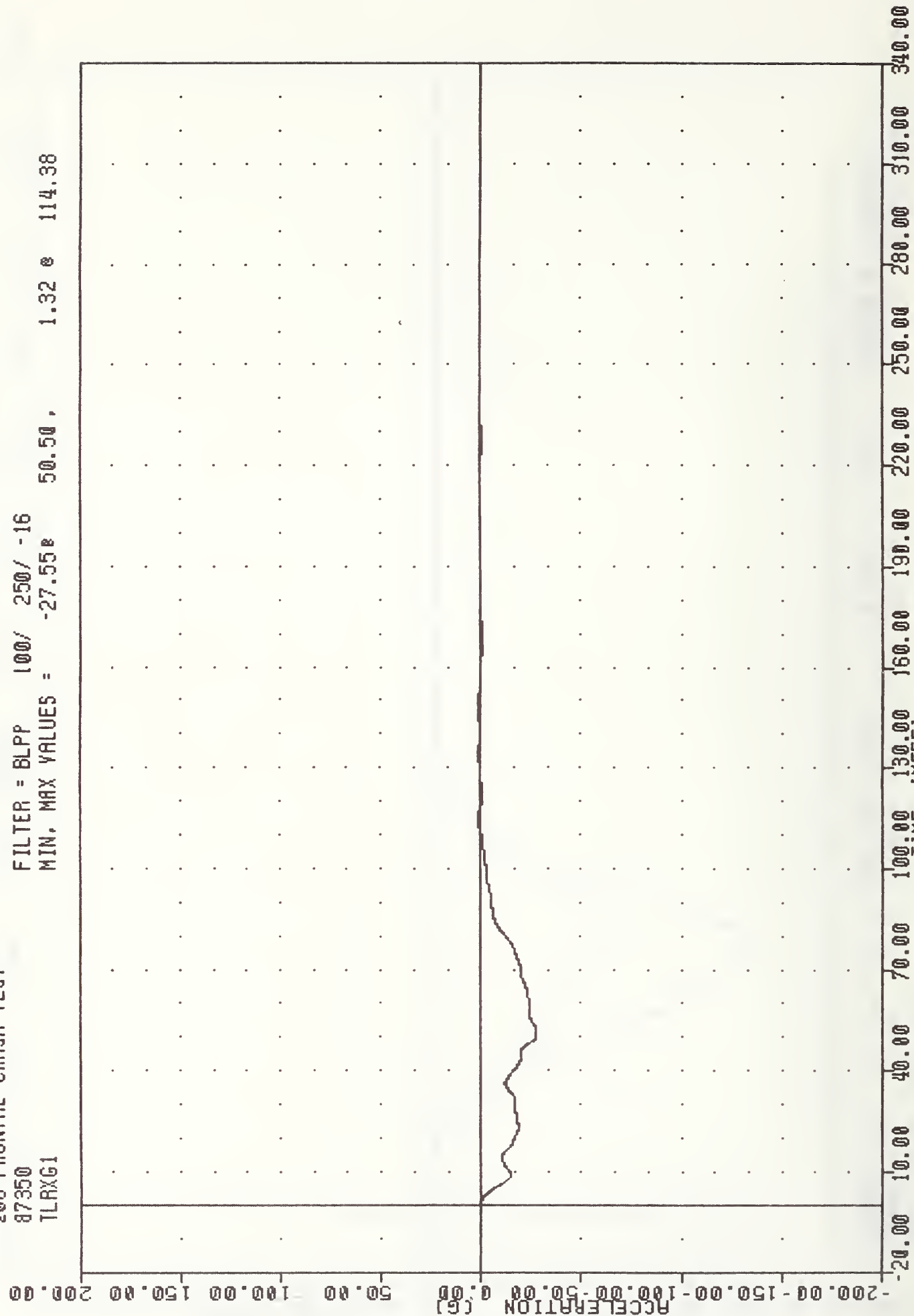
FORCE (LB)  
(X10<sup>3</sup>)



FORD ESCORT INTO FRONTAL BARRIER  
PASSENGER'S PASSIVE BELT INBOARD FORCE LBS

TRC , 871216  
 208 FRONTAL CRASH TEST  
 87350  
 TLRXG1

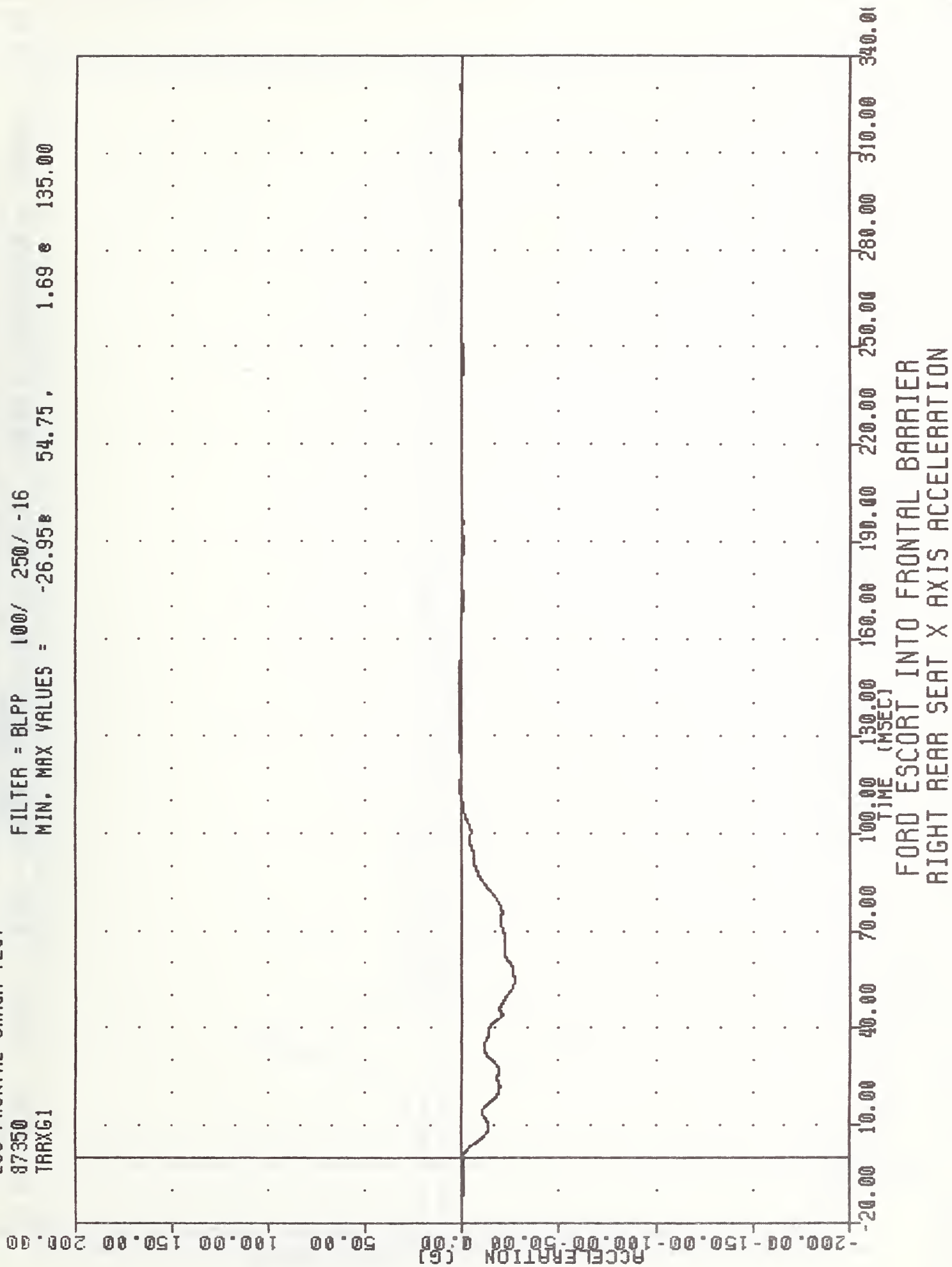
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -27.55 50.50 , 1.32 114.38



FORD ESCORT INTO FRONTAL BARRIER  
 LEFT REAR SEAT X AXIS ACCELERATION

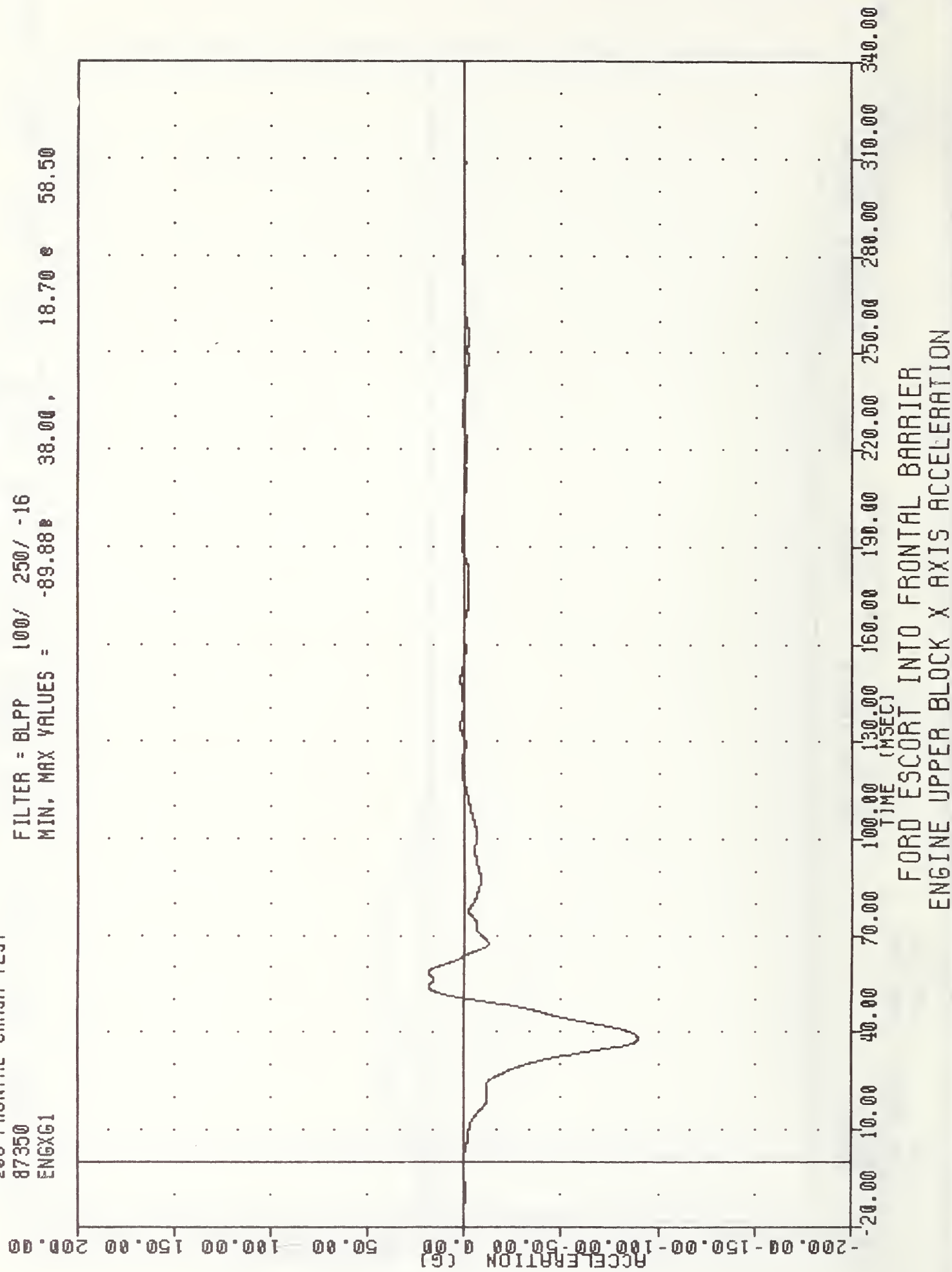
TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 TRRXG1

FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -26.95 54.75 , 1.69 135.00



TRC , 871216  
208 FRONTAL CRASH TEST  
87350  
ENGXG1

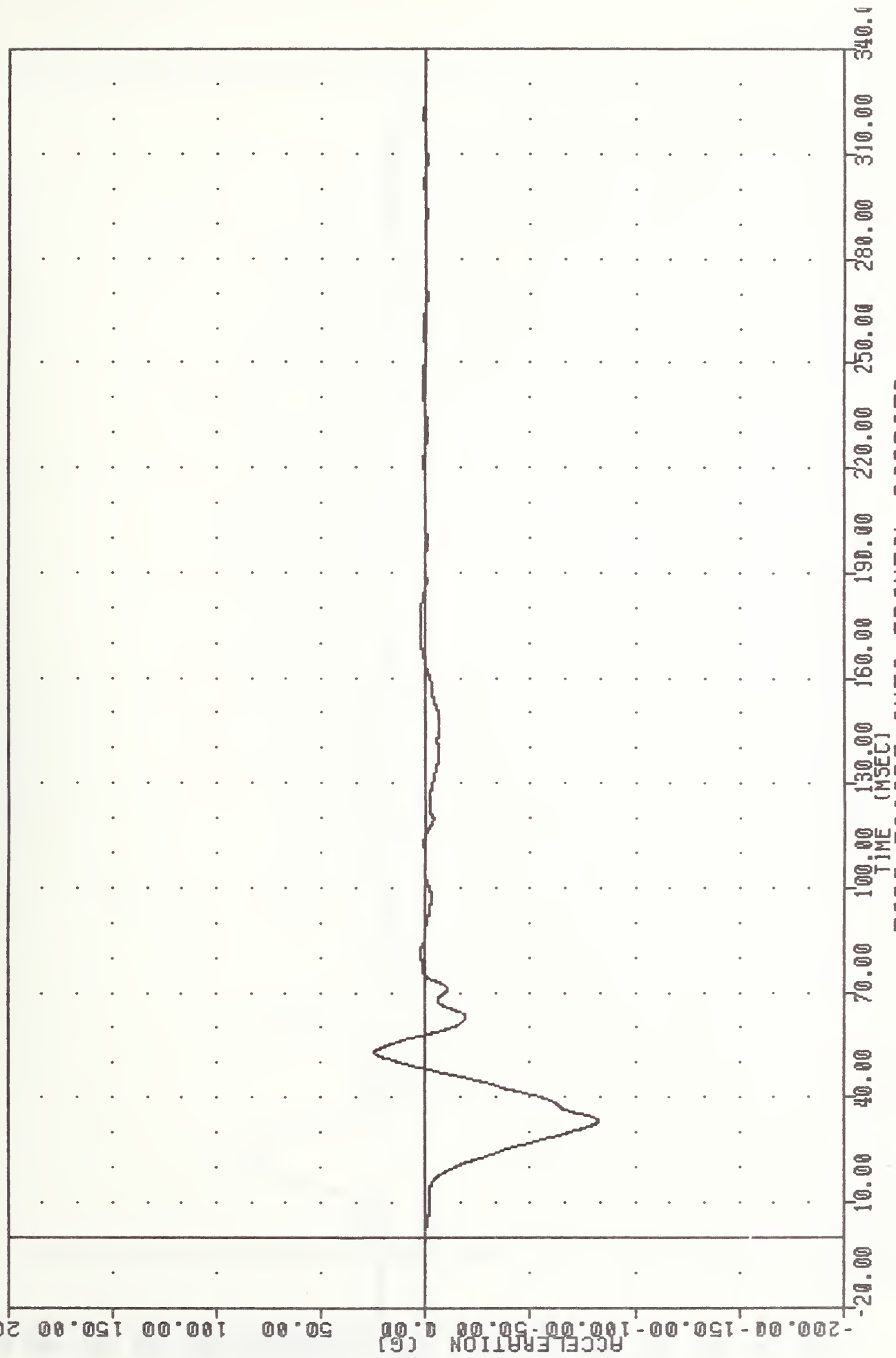
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -89.88 38.00 , 18.70 58.50





TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 ENGCG2

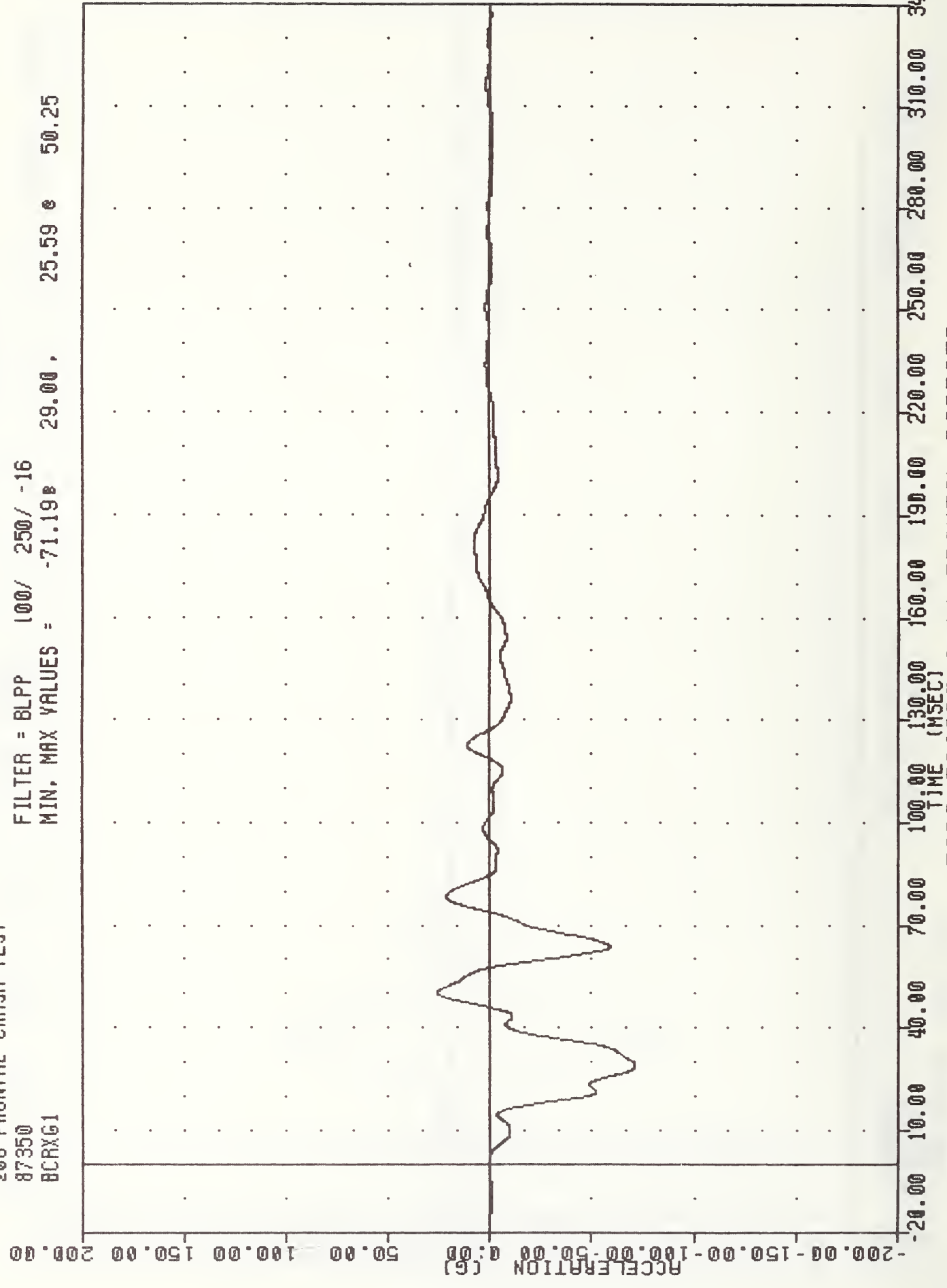
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -82.81 33.25 , 24.62 53.00



FORD ESCORT INTO FRONTAL BARRIER  
 ENGINE BOTTOM X AXIS ACCELERATION

TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 BCRXG1

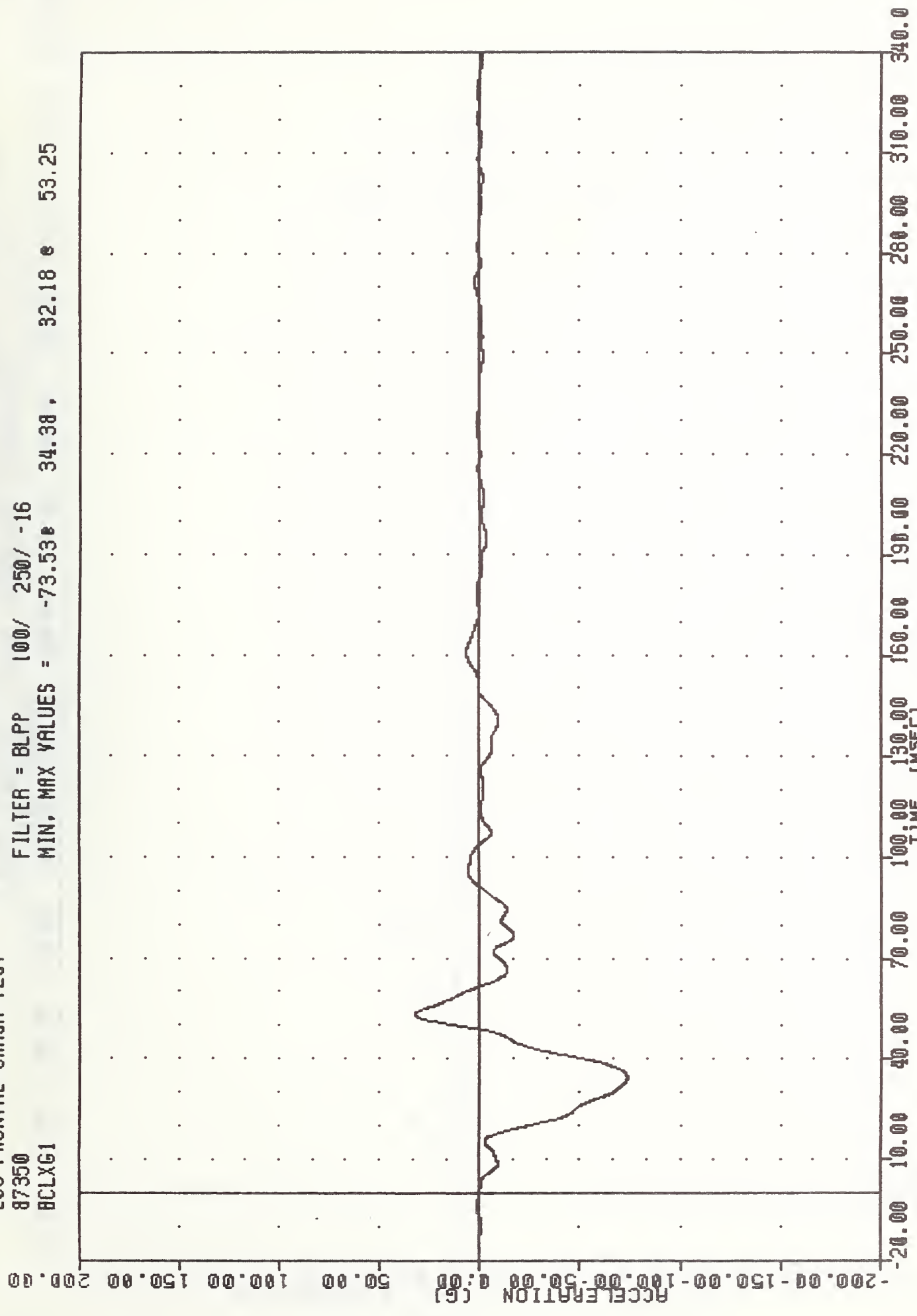
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -71.19 29.00 , 25.59 50.25



FORD ESCORT INTO FRONTAL BARRIER  
 RIGHT BRAKE CALIPER X AXIS ACCELERATION

TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 BCLXG1

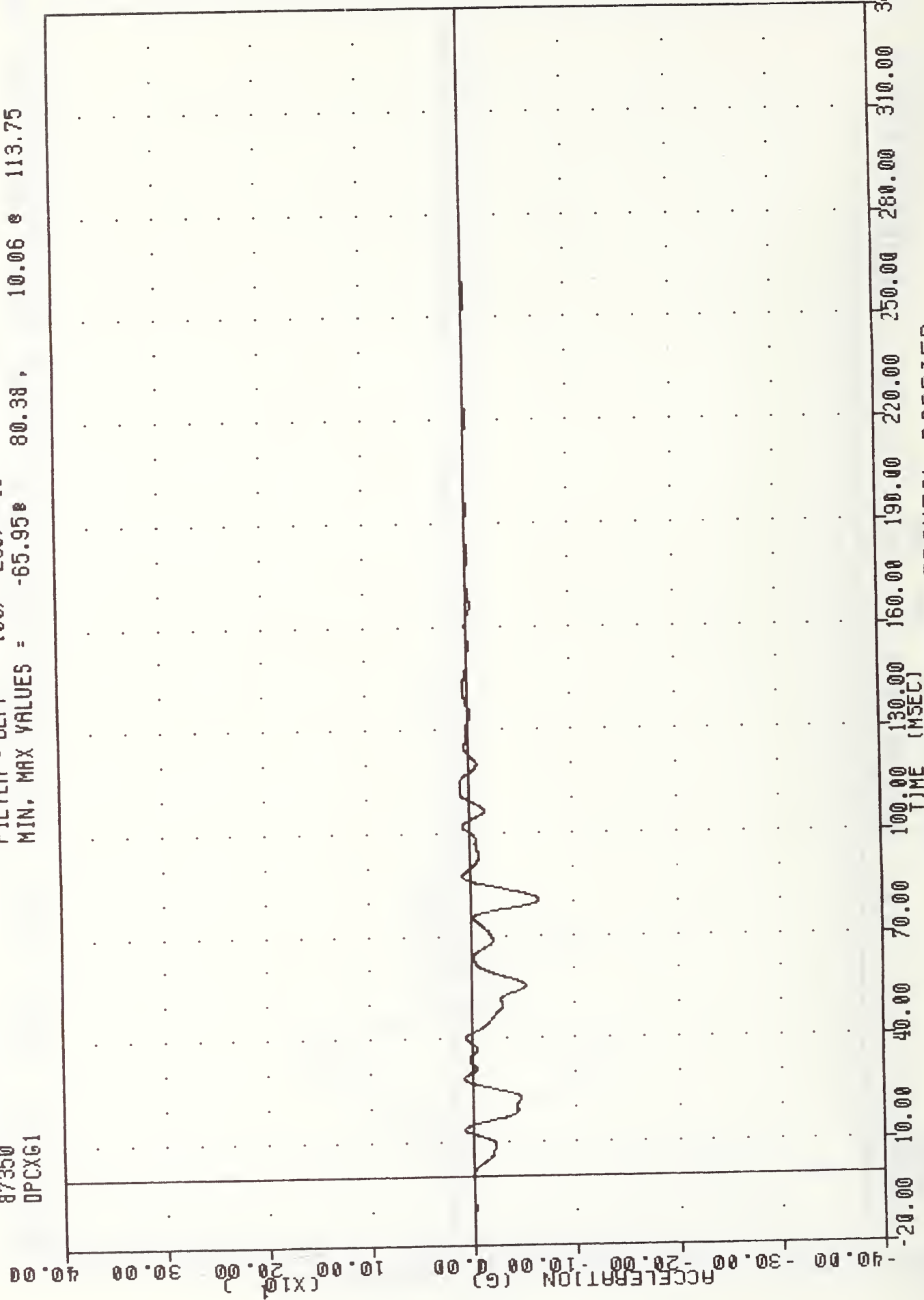
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -73.53 34.38 32.18 53.25



FORD ESCORT INTO FRONTAL BARRIER  
 LEFT BRAKE CALIPER X AXIS ACCELERATION

TRC , 871216  
 200 FRONTAL CRASH TEST  
 87350  
 OPCXG1

FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -65.95 80.38 10.06 113.75



FORD ESCORT INTO FRONTAL BARRIER  
 DASH PANEL CENTER X AXIS ACCELERATION



APPENDIX C

DUMMY CERTIFICATION INFORMATION

PRE-TEST CALIBRATION

S/N: 45

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

12-DEC-87

VRTC

45C27HD1

HY3 SH45 HEAD DROP CAL 27

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.50 DEG. F
RELATIVE HUMIDITY	10% - 70%	39.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	258.69 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.09 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Chas. Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

12-DEC-87

VRTC

45C27NE1

HY3 SN45 CAL27 NECK EXTENSION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.80 DEG. F
RELATIVE HUMIDITY	10% - 70%	37.00 %
IMPACT VELOCITY	19.50 - 20.30 FPS	19.57 FPS
PENDULUM	10 MS   17.20 - 21.20 G	20.20 G
DECELERATION	20 MS   14.00 - 19.00 G	17.09 G
	30 MS   11.00 - 16.00 G	13.73 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	13.67 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	38.00 MS
IN PLANE	MAX   81 - 106 DEG.	102.38 DEG.
ROTATION	TIME   72 - 82 MS	82.00 MS
MOMENT ABOUT OCCIPITAL	MIN   -59.0/-39.0 FT.LB	-53.75 FT.LBS
CONDYLE	TIME   65 - 79 MS	74.00 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	165.63 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	141.00 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Chris Middleton*



TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

12-DEC-87

CHRYSLER

45C27NF1

HY3 SN45 CAL27 NECK FLEXION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	70.20 DEG. F
RELATIVE HUMIDITY	10% - 70%	37.00 %
IMPACT VELOCITY	22.6 - 23.4 FPS	23.17 FPS
PENDULUM	10 MS   22.50 - 27.50 G	24.38 G
DECELERATION	20 MS   17.60 - 22.60 G	20.11 G
	30 MS   12.50 - 18.50 G	16.77 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	16.72 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 42 MS	38.50 MS
PLANE	MAX   64 - 78 DEG.	76.19 DEG.
ROTATION	TIME   57 - 64 MS	64.00 MS
MOMENT ABOUT OCCIPITAL	MAX   65 - 80 FT.LBS	73.47 FT.LBS
CONDYLE	TIME   47 - 58 MS	53.25 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	113 - 128 MS	123.88 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	97 - 107 MS	104.63 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

*Phas. Middleton*

14-DEC-87

HY3 SN45 CAL 27 H.S. THORAX 01

C-6

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

12-DEC-87

LEFT  
VRTC

KNEE  
45C271K1

HY3 SR45 L.KNEE 11LB CAL 27

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.40 DEG. F
RELATIVE HUMIDITY	10% - 70%	38.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1397.04 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

*Chas. Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

12-DEC-87

RIGHT  
VRTC

KNEE  
45C27RK1

HY3 SN45 R.KNEE 11LB CAL 27

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.40 DEG. F
RELATIVE HUMIDITY	10% - 70%	38.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1362.14 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Chas. Middle*



PRE-TEST CALIBRATION

S/N: 143

# HYBRID III EXTERIOR DIMENSIONS

Dimensional Symbol	Description	Spec Dimension	Dummy Dimension SN <u>143</u>
A	Sitting Height (Erect)	34.8 ±.2	<u>34.7</u>
B	Shoulder Pivot Height	20.2 ±.3	<u>20.2</u>
C	"H" Point Height	3.4 ref.	<u>3.4</u>
D	"H" Point Location from Back Line	5.4 ref.	<u>5.4</u>
E	Shoulder Pivot Location from Back Line	3.5 ±.2	<u>3.5</u>
F	Thigh Clearance	5.8 ±.3	<u>5.8</u>
G	Back of Elbow to Wrist Pivot	11.7 ±.3	<u>11.5</u>
H	Occiput to Z-Axis	1.7 ±.1	<u>1.7</u>
I	Shoulder - Elbow Length	13.3 ±.3	<u>13.0</u>
J	Elbow Rest Height	7.9 ±.4	<u>8.2</u>
K	Buttock Knee Length	23.3 ±.5	<u>22.9</u>
L	Popliteal Height	17.4 ±.5	<u>17.2</u>
M	Knee Pivot Height	19.4 ±.3	<u>19.2</u>
N	Buttock Popliteal Length	18.3 ±.5	<u>18.6</u>
O	Chest Depth	8.7 ±.3	<u>8.8</u>
P	Foot Length	10.2 ±.3	<u>10.1</u>
V	Shoulder Breadth	16.9 ±.3	<u>16.7</u>
W	Foot Breadth	3.9 ±.3	<u>3.7</u>
Y	Chest Circumference	38.8 ±.6	<u>38.4</u>
Z	Waist Circumference	33.5 ±.6	<u>33.8</u>
AA	Location for Measurement of Chest Circumference	17.0 ±.1	<u>17.0</u>
BB	Location for Measurement of Waist Circumference	9.0 ±.1	<u>9.0</u>

NOTE: The "H" point is located 1.83 inches forward and 2.57 inches down from the center of the pelvis angle reference hole.

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

01-DEC-87

VRTC

143C3HD1

HY3 SN143 HEAD DROP CAL 3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.70 DEG. F
RELATIVE HUMIDITY	10% - 70%	26.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	254.31 G
PEAK LATERAL ACCELERATION	15 G MAX	-4.57 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Chas. M. Mallet*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

02-DEC-87

VRTC

143C3NE1

HY3 SN143 CAL3 NECK EXTENSION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.20 DEG. F
RELATIVE HUMIDITY	10% - 70%	27.00 %
IMPACT VELOCITY	19.50 - 20.30 FPS	19.60 FPS
PENDULUM	10 MS   17.20 - 21.20 G	20.30 G
DECELERATION	20 MS   14.00 - 19.00 G	15.44 G
	30 MS   11.00 - 16.00 G	13.95 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	13.91 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	38.63 MS
D PLANE	MAX   81 - 106 DEG.	102.34 DEG.
ROTATION	TIME   72 - 82 MS	80.25 MS
MOMENT ABOUT OCCIPITAL	MIN   -59.0/-39.0 FT.LB	-57.61 FT.LBS
CONDYLE	TIME   65 - 79 MS	74.88 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	165.25 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	146.88 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

*Chas. Middleton*



TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

02-DEC-87

VRTC

143C3NF1

HY3 SN143 CAL3 NECK FLEXION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.70 DEG. F
RELATIVE HUMIDITY	10% - 70%	28.00 %
IMPACT VELOCITY	22.6 - 23.4 FPS	23.11 FPS
PENDULUM	10 MS   22.50 - 27.50 G	25.51 G
DECELERATION	20 MS   17.60 - 22.60 G	20.70 G
	30 MS   12.50 - 18.50 G	16.27 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	16.17 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 42 MS	36.50 MS
D PLANE	MAX   64 - 78 DEG.	76.79 DEG.
ROTATION	TIME   57 - 64 MS	58.75 MS
MOMENT ABOUT OCCIPITAL	MAX   65 - 80 FT.LBS	73.55 FT.LBS
CONDYLE	TIME   47 - 58 MS	52.88 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	113 - 128 MS	120.13 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	97 - 107 MS	104.25 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

*Chas. Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

02-DEC-87

VRTC

143C3TH1

HY3 SN143 CAL 3 H.S.THORAX 01

-----		
	HIGH SPEED TEST	
	-----	
TEST PARAMETER	SPECIFICATION	TEST RESULTS
=====		
TEMPERATURE	69 - 72 DEG. F	71.80 DEG. F
-----		
RELATIVE HUMIDITY	10% - 70%	26.00 %
-----		
PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.92 FT/SEC
-----		
MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.81 INCHES
-----		
MAXIMUM RESISTIVE FORCE	1080 - 1245 POUNDS	1227.0 POUNDS
-----		
INTERNAL HYSTERESIS	69% - 85%	73.3%
-----		

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

*Chas. Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

01-DEC-87

LEFT KNEE  
VRTC 143C3LK1

HY3 SN143 L.KNEE 11LB CAL 3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.60 DEG. F
RELATIVE HUMIDITY	10% - 70%	26.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1159.47 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

*Chas. Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

01-DEC-87

RIGHT  
VRTC

KNEE  
143C3RK1

HY3 SN143 R.KNEE 11LB CAL 3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.70 DEG. F
RELATIVE HUMIDITY	10% - 70%	26.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.91 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1139.25 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton



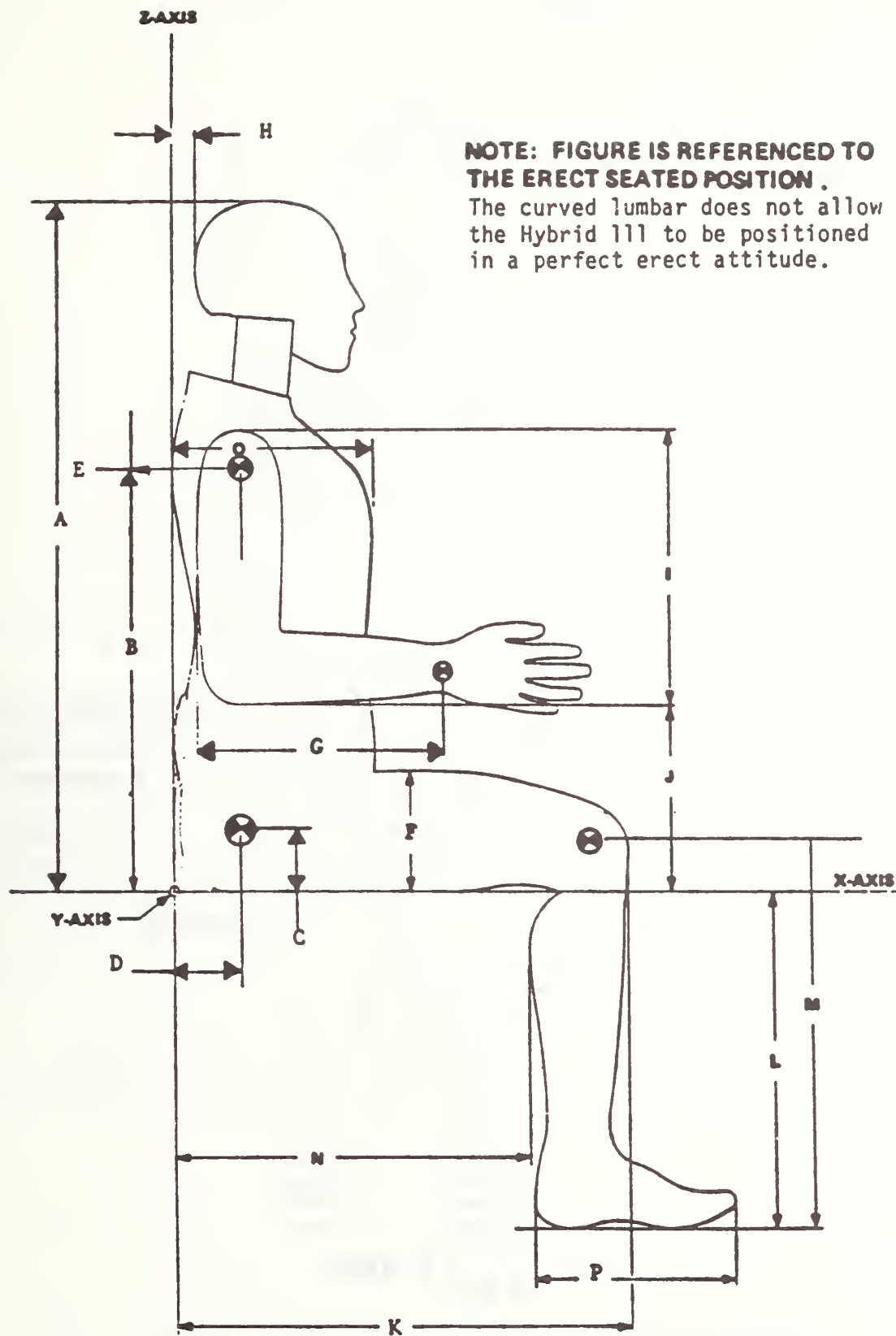
POST-TEST CALIBRATION

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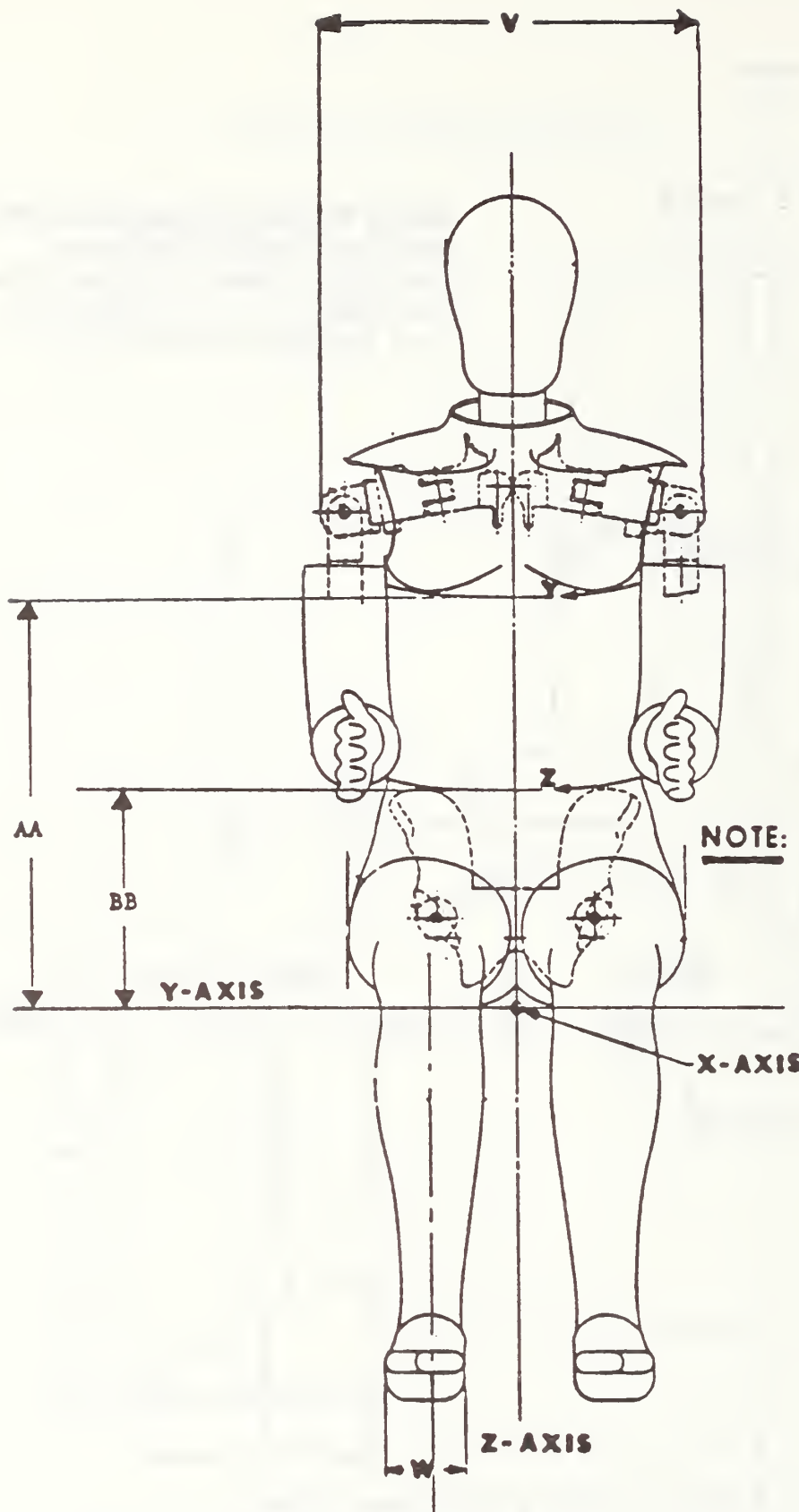
# HYBRID III EXTERIOR DIMENSIONS

Dimensional Symbol	Description	Spec Dimension	Dummy Dimension SN 45
A	Sitting Height (Erect)	34.8 $\pm$ .2	<u>34.6</u>
B	Shoulder Pivot Height	20.2 $\pm$ .3	<u>20.0</u>
C	"H" Point Height	3.4 ref.	<u>3.4</u>
D	"H" Point Location from Back Line	5.4 ref.	<u>5.4</u>
E	Shoulder Pivot Location from Back Line	3.5 $\pm$ .2	<u>3.7</u>
F	Thigh Clearance	5.8 $\pm$ .3	<u>5.8</u>
G	Back of Elbow to Wrist Pivot	11.7 $\pm$ .3	<u>11.5</u>
H	Occiput to Z-Axis	1.7 $\pm$ .1	<u>1.7</u>
I	Shoulder - Elbow Length	13.3 $\pm$ .3	<u>13.6</u>
J	Elbow Rest Height	7.9 $\pm$ .4	<u>7.9</u>
K	Buttock Knee Length	23.3 $\pm$ .5	<u>23.0</u>
L	Popliteal Height	17.4 $\pm$ .5	<u>17.5</u>
M	Knee Pivot Height	19.4 $\pm$ .3	<u>19.5</u>
N	Buttock Popliteal Length	18.3 $\pm$ .5	<u>17.9</u>
O	Chest Depth	8.7 $\pm$ .3	<u>8.6</u>
P	Foot Length	10.2 $\pm$ .3	<u>10.2</u>
V	Shoulder Breadth	16.9 $\pm$ .3	<u>16.8</u>
W	Foot Breadth	3.9 $\pm$ .3	<u>3.9</u>
Y	Chest Circumference	38.8 $\pm$ .6	<u>38.8</u>
Z	Waist Circumference	33.5 $\pm$ .6	<u>33.6</u>
AA	Location for Measurement of Chest Circumference	17.0 $\pm$ .1	<u>17.0</u>
BB	Location for Measurement of Waist Circumference	9.0 $\pm$ .1	<u>9.0</u>

NOTE: The "H" point is located 1.83 inches forward and 2.57 inches down from the center of the pelvis angle reference hole.



HYBRID III Exterior Body Dimensions - Side View



**NOTE: FIGURE REFERENCED  
TO THE ERECT SEATED  
POSITION.**

The curved lumbar does  
not allow the Hybrid III  
to be positioned in a  
perfect erect attitude.

**HYBRID III Exterior Body Dimensions - Front View**



TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

07-Jan-88

VRTC

45C28HD1

HY3 SN45 HEAD DROP CAL28

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70.10 DEG. F
RELATIVE HUMIDITY	10% - 70%	13.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	250.64 G
PEAK LATERAL ACCELERATION	15 G MAX	-2.22 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Don Moug*

## TRANSPORTATION RESEARCH CENTER OF OHIO

## NECK EXTENSION TEST

## HYBRID III

3 AXIS NECK TRANSDUCER

09-Jan-88

VRTC

45C28NE1

HY3 SN45 CAL28 NECK EXTENSION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.80 DEG. F
RELATIVE HUMIDITY	10% - 70%	14.00 %
IMPACT VELOCITY	19.50 - 20.30 FPS	19.99 FPS
PENDULUM	10 MS   17.20 - 21.20 G	18.47 G
DECELERATION	20 MS   14.00 - 19.00 G	16.21 G
	30 MS   11.00 - 16.00 G	11.11 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	11.30 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	43.38 MS
D PLANE	MAX   81 - 106 DEG.	99.12 DEG.
ROTATION	TIME   72 - 82 MS	81.75 MS
MOMENT ABOUT OCCIPITAL	MIN   -59.0/-39.0 FT.LB	-52.42 FT.LBS
CONDYLE	TIME   65 - 79 MS	75.63 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	169.88 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	143.75 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

08-Jan-88

VRTC

45C28NF1

HY3 SN45 CAL28 NECK FLEXION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	16.00 %
IMPACT VELOCITY	22.6 - 23.4 FPS	22.86 FPS
PENDULUM	10 MS   22.50 - 27.50 G	25.97 G
DECELERATION	20 MS   17.60 - 22.60 G	19.72 G
	30 MS   12.50 - 18.50 G	16.20 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	16.10 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 42 MS	37.63 MS
D PLANE	MAX   64 - 78 DEG.	75.46 DEG.
ROTATION	TIME   57 - 64 MS	62.38 MS
MOMENT ABOUT OCCIPITAL	MAX   65 - 80 FT.LBS	71.55 FT.LBS
CONDYLE	TIME   47 - 58 MS	52.13 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	113 - 128 MS	125.75 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	97 - 107 MS	104.63 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

*Jim May*

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

09-Jan-88

VRTC

45C28TH1

HY3 SN45 CAL 28 H.S.THORAX 01

	HIGH SPEED TEST	
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	70.80 DEG. F
RELATIVE HUMIDITY	10% - 70%	14.00 %
PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.62 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.79 INCHES
MAXIMUM RESISTIVE FORCE	1080 - 1245 POUNDS	1204.7 POUNDS
INTERNAL HYSTERESIS	69% - 85%	73.9%

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

*Don Montgomery*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

07-Jan-88

LEFT KNEE

VRTC

45C28LK1

HY3 SN45 L.KNEE 11LB CAL28

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	69.60 DEG. F
RELATIVE HUMIDITY	10% - 70%	13.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.87 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1381.69 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

*Jim May*



TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

07-Jan-88

RIGHT KNEE  
VRTC 45C28RK1

HY3 SN45 R.KNEE 11LB CAL28

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	69.90 DEG. F
RELATIVE HUMIDITY	10% - 70%	13.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1432.22 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Jim May*

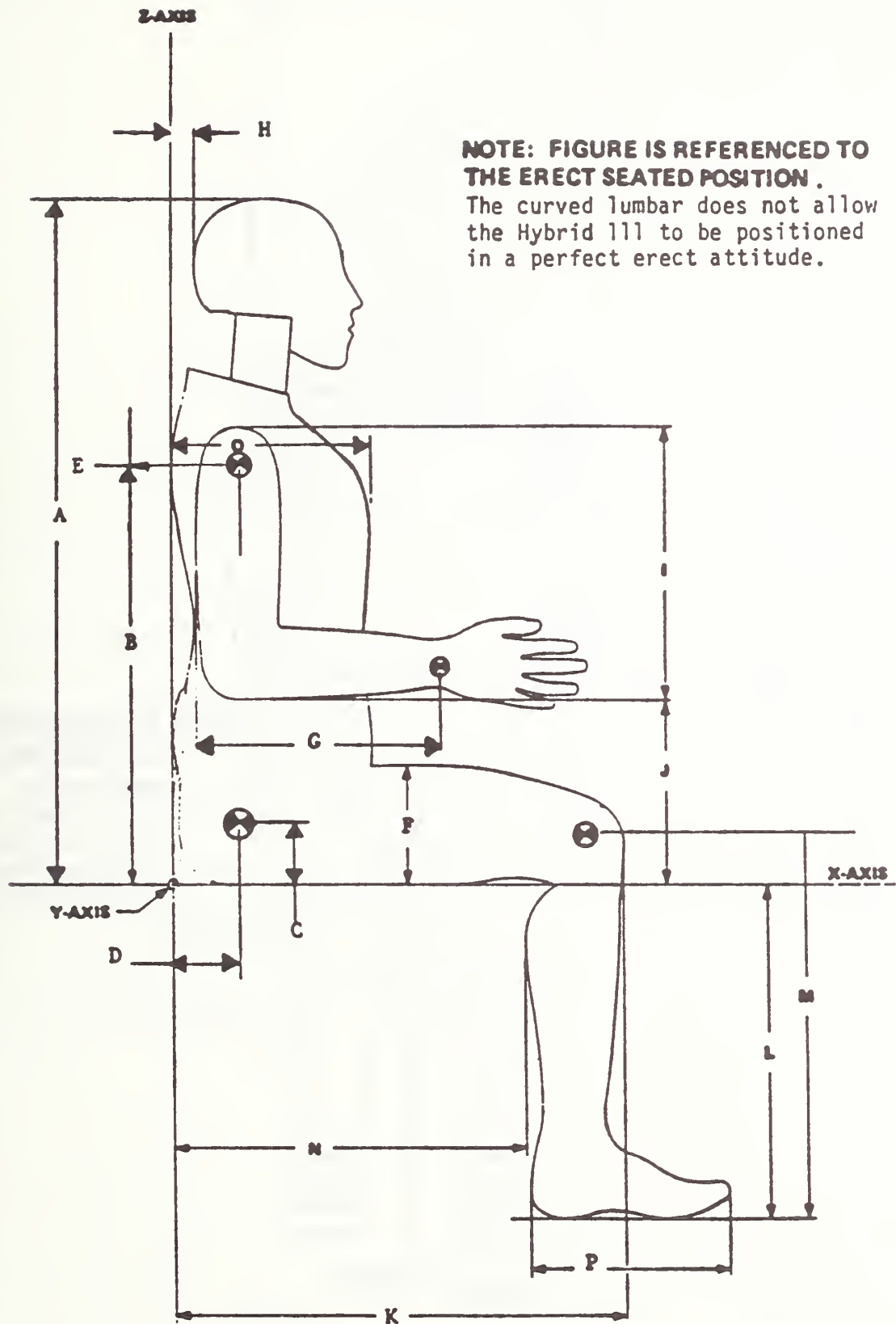
POST-TEST CALIBRATION

S/N: 143

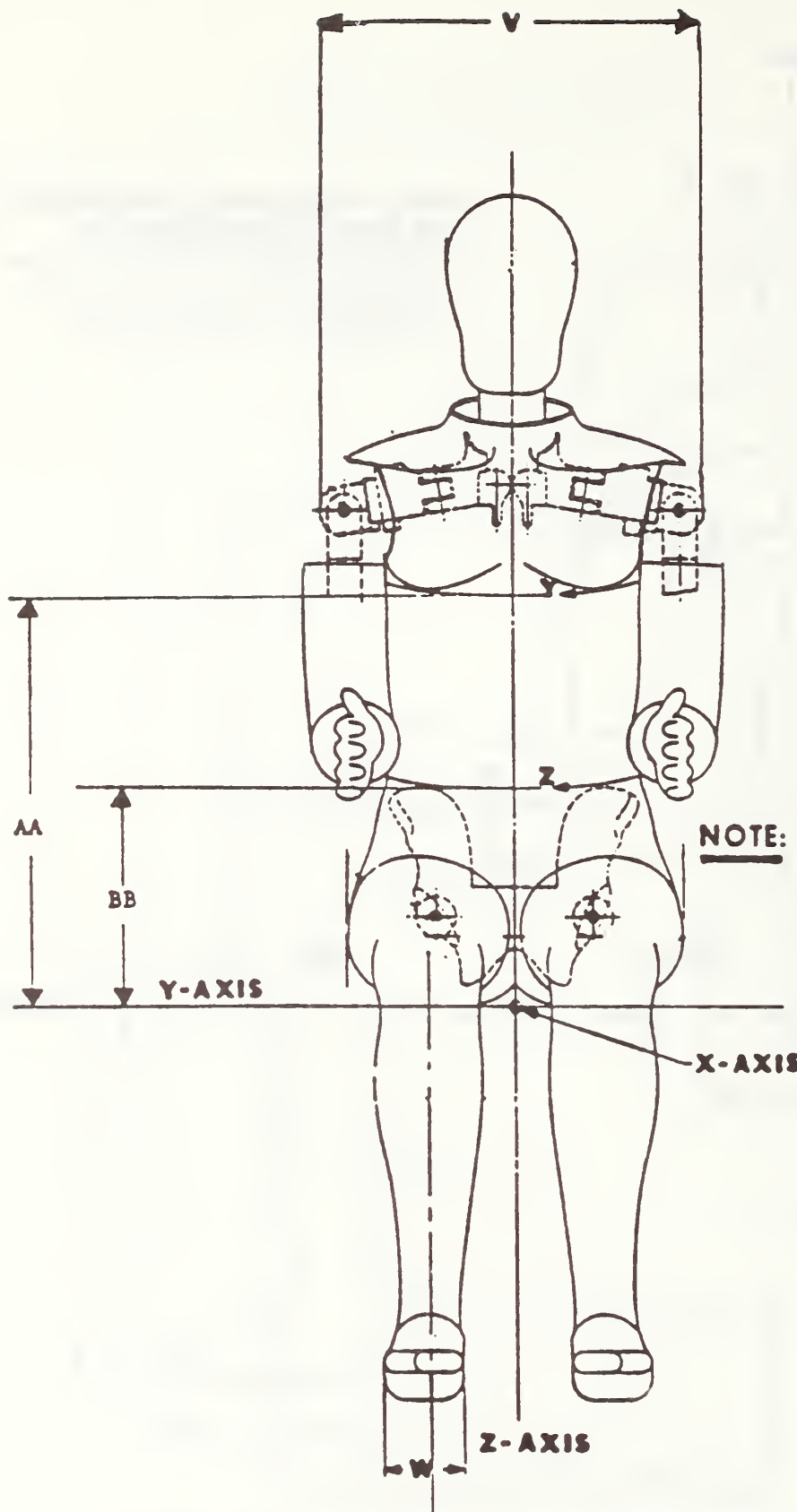
HYBRID III EXTERIOR DIMENSIONS

Dimensional Symbol	Description	Spec Dimension	Dummy Dimension SN 143
A	Sitting Height (Erect)	34.8 ±.2	<u>34.7</u>
B	Shoulder Pivot Height	20.2 ±.3	<u>20.0</u>
C	"H" Point Height	3.4 ref.	<u>3.4</u>
D	"H" Point Location from Back Line	5 ref.	<u>5.4</u>
E	Shoulder Pivot Location from Back Line	3.5 ±.2	<u>3.7</u>
F	Thigh Clearance	5.8 ±.3	<u>5.9</u>
G	Back of Elbow to Wrist Pivot	11.7 ±.3	<u>11.6</u>
H	Occiput to Z-Axis	1.7 ±.1	<u>1.7</u>
I	Shoulder - Elbow Length	13.3 ±.3	<u>13.2</u>
J	Elbow Rest Height	7.9 ±.4	<u>8.1</u>
K	Buttock Knee Length	23.3 ±.5	<u>23.0</u>
L	Popliteal Height	17.4 ±.5	<u>17.4</u>
M	Knee Pivot Height	19.4 ±.3	<u>19.5</u>
N	Buttock Popliteal Length	18.3 ±.5	<u>18.0</u>
O	Chest Depth	8.7 ±.3	<u>8.7</u>
P	Foot Length	10.2 ±.3	<u>10.2</u>
V	Shoulder Breadth	16.9 ±.3	<u>16.8</u>
W	Foot Breadth	3.9 ±.3	<u>4.0</u>
Y	Chest Circumference	38.8 ±.6	<u>38.9</u>
Z	Waist Circumference	33.5 ±.6	<u>33.8</u>
AA	Location for Measurement of Chest Circumference	17.0 ±.1	<u>17.0</u>
BB	Location for Measurement of Waist Circumference	9.0 ±.1	<u>9.0</u>

NOTE: The "H" point is located 1.83 inches forward and 2.57 down down from the center of the pelvis angle reference hole.



HYBRID III Exterior Body Dimensions - Side View



**NOTE: FIGURE REFERENCED  
TO THE ERECT SEATED  
POSITION.**

The curved lumbar does  
not allow the Hybrid III  
to be positioned in a  
perfect erect attitude.

HYBRID III Exterior Body Dimensions - Front View



TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

06-Jan-88

VRTC

143C4HD1

HY3 SN143 HEAD DROP CAL 4

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.70 DEG. F
RELATIVE HUMIDITY	10% - 70%	15.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	250.53 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.05 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Jim Mung*

# TRANSPORTATION RESEARCH CENTER OF OHIO

## NECK EXTENSION TEST

### HYBRID III

3 AXIS NECK TRANSDUCER

08-Jan-88

VRTC

143C4NE1

HY3 SN143 CAL4 NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71.60 DEG. F
RELATIVE HUMIDITY		10% - 70%	16.00 %
IMPACT VELOCITY		19.50 - 20.30 FPS	19.51 FPS
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	19.87 G
	20 MS	14.00 - 19.00 G	16.07 G
	30 MS	11.00 - 16.00 G	12.30 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	12.20 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	42.25 MS
D PLANE	MAX	81 - 106 DEG.	111.37 DEG. **
ROTATION	TIME	72 - 82 MS	75.75 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-59.0/-39.0 FT.LB	-52.40 FT.LBS
	TIME	65 - 79 MS	75.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	171.38 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	160.50 MS **

\*\*\* TEST DOES NOT MEET SPECIFICATIONS \*\*\*

TECHNICIAN

*Edm Mow*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

07-Jan-88

VRTC

143C4NF1

HY3 SN143 CAL4 NECK FLEXION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	70.60 DEG. F
RELATIVE HUMIDITY	10% - 70%	12.00 %
IMPACT VELOCITY	22.6 - 23.4 FPS	23.00 FPS
PENDULUM	10 MS   22.50 - 27.50 G	28.84 G **
DECELERATION	20 MS   17.60 - 22.60 G	20.72 G
	30 MS   12.50 - 18.50 G	16.78 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	16.66 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 42 MS	34.88 MS
D PLANE	MAX   64 - 78 DEG.	79.62 DEG.**
ROTATION	TIME   57 - 64 MS	61.38 MS
MOMENT ABOUT OCCIPITAL	MAX   65 - 80 FT.LBS	65.60 FT.LBS
CONDYLE	TIME   47 - 58 MS	55.75 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	113 - 128 MS	122.50 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	97 - 107 MS	102.50 MS

\*\*\* TEST DOES NOT MEET SPECIFICATIONS \*\*\*

TECHNICIAN *Ed M. Nagy*

## TRANSPORTATION RESEARCH CENTER OF OHIO

## THORAX IMPACT TEST

HYBRID III

09-Jan-88

VRTC

143C4TH1

HY3 SN143 CAL 04 H.S.THORAX 01

-----		
	HIGH SPEED TEST	
	-----	
TEST PARAMETER	SPECIFICATION	TEST RESULTS
=====		
TEMPERATURE	69 - 72 DEG. F	70.80 DEG. F
-----		
RELATIVE HUMIDITY	10% - 70%	14.00 %
-----		
PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.92 FT/SEC
-----		
MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.87 INCHES *
-----		
MAXIMUM RESISTIVE FORCE	1080 - 1245 POUNDS	1233.2 POUNDS
-----		
INTERNAL HYSTERESIS	69% - 85%	72.2%
-----		

\*\*\* TEST DOES NOT MEET SPECIFICATIONS \*\*\*

TECHNICIAN



TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

07-Jan-88

LEFT KNEE  
VRTC 143C4LK1

HY3 SN143 L.KNEE 11LB CAL 4

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70.60 DEG. F
RELATIVE HUMIDITY	10% - 70%	13.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.95 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1329.89 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

*Don Moug*



TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

07-Jan-88

RIGHT KNEE

VRTC 143C4RK1

HY3 SN143 R.KNEE 11LB CAL 4

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70.50 DEG. F
RELATIVE HUMIDITY	10% - 70%	13.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1298.57 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Jim May*

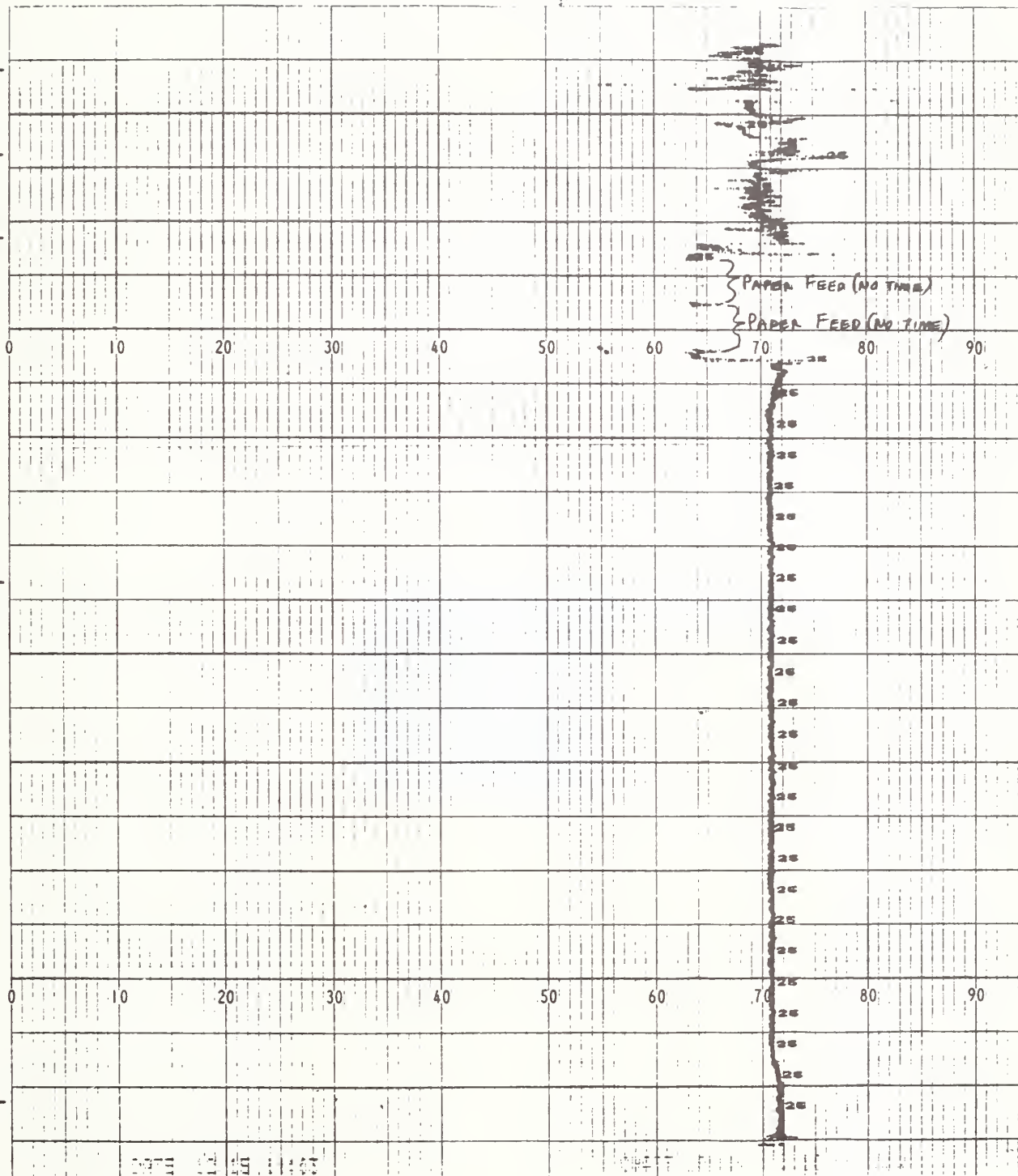
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Sankey, J.

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